wjpmr, 2019,5(12), 100-106

SJIF Impact Factor: 5.922

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

Research Article

ISSN 2455-3301

WJPMR

AN ETIOPATHOLOGICAL STUDY OF *MEDA SANCHAYA* IN LIVER W.S.R TO NON ALCOHOLIC FATTY LIVER DISEASE (NAFLD) AND CLINICAL STUDY OF *TRIPHALA GUGGULU* AND *PUNARNAVASTAK KWATHA.*

Dr. Dharmendra Kumar*[1], Prof. Pawankumar Godatwar[2], Prof. Surendra kumar Sharma[3], Dr. Priyanka Singh[4]

[1]Lecturer, Department of Rog Nidan, R.B. Ayur. Medical College, Agra.
[2]Professor & H.O.D., P.G. Department of Rog Nidan, N.I.A., Jaipur.
[3] Professor, P.G. Department of Rog Nidan, N.I.A.,Jaipur.
[4]Clinical Registrar, P.G. Department of Kayachikitsa, N.I.A. Jaipur.

***Corresponding Author: Dr. Dharmendra Kumar**

Lecturer, Department of Rog Nidan, R.B. Ayur. Medical College, Agra.

Article Received on 10/10/2019 **Article Revised on 30/10/2019** **Article Accepted on 20/11/2019**

ABSTRACT

Fatty liver has become one of the major global health concern worldwide. It is the most common cause of liver related morbidity and mortility in under developed and developing countries. *Meda* is an important *Dhatu* of body, which in its natural state, maintains *Snigdhata* and provides *Bala* to body. But when the quantity of *Meda* increases from normal, it causes various structural and functional abnormalities inside body. Excessive *Meda* deposits in the various parts and organs of body including *Yakrita*, which impairs the proper function of these organs. The excessive fat deposit inside liver causes fatty liver. Non Alcoholic Fatty Liver Disease (NAFLD) can occur at all ages including childhood, though the highest prevalence is described in those between 35– 45 years of age. With some limitations, both population and hospital-based studies from the West report that around 10–24% of general population, and 57–74% of obese individual may have Non Alcoholic Fatty Liver Disease (NAFLD). The corresponding rates for Non Alcoholic Steato Hepatitis (NASH) are 3–4% and 15–20%, respectively.

KEYWORDS: *Meda, Dhatu, Yakrita,* NAFLD, NASH.

INTRODUCTION

Meda is an important *Dhatu* of body, which in its natural state, maintains *Snigdhata* and provides *Bala* to body. But when the quantity of *Meda* increases from normal, it causes various structural and functional abnormalities inside body. According to *Acharya Charaka*[1]*Avyayama, Divaswapna*, excessive intake of *Medasvi Dravya* and *Varuni Madya* are the causative factors of *Medavaha Srotodushti.* Excessive intake of these *Ahar Vihara* leads to *Jatharagni Mandata* and decrease the *Medodhatwagni*, which leads to *Medavriddhi* so that Excessive *Meda* deposits in the various parts and organs of body including *Yakrita*, which impairs the proper function of these organs. The excessive fat deposit inside liver causes fatty liver, which in lack of treatment can cause serious conditions.

The prevalence of fatty liver disease in India is found to be as high as 24%, which is similar to that reported in some of the Western countries, where it correlates with the prevalence of obesity. NAFLD can occur at all ages including childhood, though the highest prevalence is described in those between 35– 45 years of age. With some limitations, both population and hospital-based studies from the West report that around 10–24% of general population, and 57–74% of obese individuals may have NAFLD. The corresponding rates for NASH are 3–4% and 15–20%, respectively.[2]

Here we have considered about Fatty Liver Disease because of its prevalence, tendency to cause cirrhosis and hepatocellular carcinoma.

MATERIAL AND METHODS

Aims & Objectives

1. To conduct a randomized clinical trial to evaluate the efficacy of *Triphala Guggulu*[3] with Luke warm water and *Triphala Guggulu* with *Punarnavashtaka Kwatha*[4] in *Medasanchaya* in liver (NAFLD).
2. To establish the *Ayurvedic* parameters for diagnosis of the state of *Medasanchaya* in liver (NAFLD).

The study was conducted on 60 clinically diagnosed patients of *Meda Sanchaya* in Liver w.s.r to NAFLD from OPD/IPD of NIA Jaipur, Special camps conducted by NIA Jaipur and Colleges in and around NIA Jaipur. Patients suffering from any serious diseases or having fatty liver due to secondary reasons (alcohol intake or viral hepatitis) were excluded from the study. 60 clinically diagnosed patients randomly divided into 2

Groups (A & B) having 30 patients in each as per parallel designs respectively –
Group A: *Triphala Guggulu* (500mg BD) with Luke warm water for 3 months.
Group B: *Triphala Guggulu* (500mg BD) with *Punarnavashtaka Kwatha* (30 ml) for 3 months.

Three follow ups at an interval of 30 days during trial period.
Clinical & physiological assessments were done on 0^{th} day, 30^{th}, $60^{th}$and 90^{th} day.

Inclusion criteria
Patients were having over weight (Through BMI) of more than 18 years; presenting Sign and symptom of NAFLD; Clinically diagnosed Hepatomegaly (Non Alcoholic fatty liver); Abnormal liver function test; Dyslipidemias and USG/CT Scan evidence of fatty liver.

Exclusion criteria
Patients below age group 18 years; were having Alcohol addict; Pregnant Woman; Patients suffering from major illness; biliary obstruction and Uncooperative Patients.

OBSERVATIONS AND RESULTS

a) Demographic Observations

The maximum incidences of *Meda Sanchaya* in liver w.s.r NAFLD was found in **third and fourth** decades of life ie; 14 case (46.7%) of Group A and 13 case (43.3%) of Group B. According to **Sex incidence**, Females 24 case (80%) of Group A and 21 case (70%) of Group B are more prone. Considering the relationship of the disease with **Religion,** Hindu are more prone ie; 20 case (66.7%) of Group A and 16 case (53.3%) of Group B.

Regarding the incidences of **Marital Status** 19 cases (63.3%) of Group A & 24 cases (80%) of Groups B were married, so married are more prone for the disease than unmarried. **Occupation** shows the life style, Physical activity and mental stress of a patient. Therefore, it can be counted as an important factor for causing *Meda Sanchaya* in liver w.s.r NAFLD. In this study, more than one third of both Group A 12 case (40%) and Group B 16 case (53.3%) were housewives. According to **Dietary Habits**, this disease is more common in Mixed Group. Mixed Group comprises 13 cases (43.3%) of Group A and 23 case (76.7%) of Group B. This study shows that the **Socio- Economic Status,** was maximum seen in middle class income group. Half of the patients of Group A 16 case (53.3%) & Group B 15 case (50.0%) belonged to lower middle class followed by 7 cases (23.3%) of Group A and 4 cases (13.3%) of Group B belonged to upper middle class. According to **Education Incidence**, about one third of the patients of Group A 10 case (33.3%) and 10 case (33.3%) of Group B were educated upto P.G.

According to **Habitat Incidence**, Majority of the patients were from urban area i.e. 23 cases (76.7%) of Group A and 19 Cases (63.3%) of Group-B were from Urban area. Considering the **Addiction Incidence**, percentage of non addicted is more than addicted. Considering the incidence of **associated diseases**, the menstrual disorder was observed among 8 case (26.7%) of the patients of Group A and 7 case (23.3%) of Group B. However, hyperacidity was found among 5 case (16.7%) of Group A patients and 8 case (26.7%) of Group B, Hypertension was only in Group B 2 case (6.7%) patients, Osteoarthritis was seen in 4 case (13.3%) of Group A and 5 case (16.7%) in Group B. Considering the incidence of **Deha Prakriti,** Kalpha-Pitta was found in most of the patients in both Group A 16 case (53.3%) and Group B 16 case (53.3%). Considering the incidence of **Family history**, the disease incidence was noted in 8 case (26.6%) of Group A and 8 case (26.6%) of Group B patients have hereditary tendency. On the other hand subjects having negative family history are 22 case (73.4%) in Group A and 22case (73.4%) in Group B. According to ***Agni* incidence,** *Agnimandya* was observed in 12 case (47.1%) of Group A and in 11 case (42.4%) of Group B.

b) Clinical Observations

It was observed that before use of trial drug most of the patients showed *Chala Sphik Udar Stana* (Pendulous bottocks, belly and breasts) 83.3% in Group A and 100% in Group B, *Javoparodha* (sluggishness in movement) 90.0% in Group A and 93.3% in Group B, *Swedabadha* (excessive sweating) 93.3% in Group A and 96.7% in Group B, *Krichhavyavayata* (difficulty in intercourse) 100% in Group A and 93.3% in Group B, *Kshudhatimatram* (excessive appetite) 80% in Group A and 76.7% in Group B, *Daurbalyam* (weakness) 93.3% in Group A and 90% in Group B, *Pipasatiyogam* (excessive thirst) 93.3% in Group A and 93.3% in Group B, *Daurgandhyam* (foul smell) 93.3% in Group A and 96.7% in Group B, Flatulence 100% in both Group A and B, Nausea 80% in Group A and 90% in Group B, Constipation 93.3% in Group A and 96.7% in Group B and Hepatomegaly 90% in Group A and 93.3% in Group B.

Before treatment most of the patients have raised Body Weight according to height (76.17±14.29 in Group A and 78.30±13.27 in Group B), BMI (31.48±4.41 in Group A and 32.54±4.36 in Group B) & WHR (0.95±0.14 in Group A and 0.97±0.09 in Group B).

RESULTS

In the present clinical study, trial drug *Triphala Guggulu* with Luke warm water was given in 30 patients of Group A and *Triphala Guggulu* with *Punarnavastaka kvatha* was administered in 30 patients of Group B for a period of 90 days and results on Signs and symptoms of Disease in Group A and B are as follows:-

Signs and symptoms	Group	Before treatment	After treatment	Mean change	z-value	p-value
CHALA SPHIKA UDARA STANA (PENDULOUS BUTTOCKS, BELLY AND BREASTS)	Group A	1.50±0.97	1.33±0.99	0.16±0.37	2.40	0.0001*
	Group B	2.13±0.68	1.93±0.69	0.20±0.40	2.69	0.0001*
*JAVOPARODHA (*SLUGGISHNESS IN MOVEMENTS*)*	Group A	1.37±0.76	0.43±0.50	0.93±0.82	1.83	0.0001*
	Group B	1.73±0.478	0.63±0.49	1.10±0.54	1.55	0.0001*
*KṚCCHAVYAVAYATA (*DIFFICULTY IN INTERCOURSE	Group A	1.93±0.69	1.07±0.69	0.86±0.34	1.63	0.0001*
	Group B	1.90±0.88	0.77±0.62	1.12±0.50	1.76	0.0001*
*SVEDABADHA (*EXCESSIVE SWEATING*)*	Group A	1.97±0.89	1.10±0.71	0.86±0.34	1.54	0.0001*
	Group B	2.00±0.78	1.07±0.74	0.93±0.36	0.17	0.05
*KSHUDATIMATRA (*EXCESSIVE APPETITE*)*	Group A	2.13±0.73	1.40±0.62	0.73±0.52	0.72	0.0001*
	Group B	2.00±0.69	1.10±0.66	0.90±0.40	1.81	0.0001*
*DAURBALYAM (*WEAKNESS)	Group A	2.03±0.85	0.57±0.56	1.46±0.62	1.71	0.0001*
	Group B	1.67±0.80	0.73±0.64	0.93±0.45	1.06	0.0001*
PIPASATIYOGAM (EXCESSIVE THIRST)	Group A	1.77±0.85	0.87±0.68	0.90±0.48	0.30	0.01*
	Group B	1.70±0.83	0.60±0.56	1.10±0.48	1.65	0.001*
DAURGANDHA (FOUL SMELL)	Group A	1.83±0.83	0.93±0.74	0.90±0.30	5.36	0.0001*
	Group B	1.83±0.69	0.87±0.62	0.96±0.18	5.64	0.0001*
FLATULENCE	Group A	2.57±0.50	2.27±0.52	0.30±0.53	3.07	0.005*
	Group B	2.43±0.62	0.90±0.71	1.62±0.53	13.35	0.0001*
NAUSEA	Group A	1.17±0.83	0.80±0.66	0.36±0.49	4.09	0.0001*
	Group B	1.27±0.64	0.30±0.33	0.93±0.69	7.93	0.0001*
CONSTIPATION	Group A	2.33±0.84	1.17±0.64	1.16±0.59	10.79	0.0001*
	Group B	2.50±0.73	0.17±0.39	2.33±0.71	17.97	0.0001*
HEPATOMEGALY	Group A	1.23±0.62	0.60±0.56	0.63±0.55	6.23	0.0001*
	Group B	1.27±0.58	0.60±0.62	0.66±0.66	5.52	0.0001*
WEIGHT	Group A	76.17±14.29	71.23±13.44	4.93±2.46	10.97	0.0001*
	Group B	78.30±13.27	69.97±12.31	8.33±2.59	17.61	0.0001*
BODY MASS INDEX	Group A	31.48±4.41	29.45±4.36	2.02±0.82	13.53	0.0001*
	Group B	32.54±4.36	29.06±3.98	3.48±1.08	13.17	0.0001*
WHR	Group A	0.95±0.14	0.90±0.08	0.04±0.06	3.96	0.0001*
	Group B	0.97±0.09	0.95±0.07	0.02±0.03	4.14	0.0001*

- **EFFECT ON HAEMATOLOGICAL PARAMETERS**

Blood examinations were performed in all the 60 patients before and after trial was Hemogram, Liver Function Test (LFT), Lipid Profile.

Comparison of biochemical parameters from before to after treatment between groups

Time interval	Group A	Group B	t-value	p-value
Hb				
Before	11.42±1.50	10.94±1.57	0.56	0.23
After	11.81±1.29	11.46±1.12	0.48	0.26
Z-value	3.06	4.10		
Mean change, p-value	0.40±0.59, 0.001*	0.52±0.58, 0.001*		
TLC				
Before	7623.33±1745.07	7133.33±1890.69	0.65	0.30
After	6553.33±896.63	6390.00±1221.46	0.89	0.55
Z-value	9.01	5.60		
Mean change, p-value	1070.00±1354.97, 0.0001*	743.33±1220.42, 0.002*		
Neutrophil				
Before	61.77±7.68	64.40±7.26	0.89	0.17
After	61.33±7.55	63.80±6.79	0.45	0.18
Mean change, p-value	0.43±0.77, 0.005*	0.60±1.24, 0.01*		
Z-value	4.12	3.15		

Eosinophil				
Before	1.90±2.09	1.17±1.72	0.99	0.14
After	1.10±1.51	0.40±0.72	2.13	0.02*
Z-value	3.99	3.56		
Mean change, p-value	0.80±1.18, 0.001*	0.76±1.25, 0.002*		
BASOPHIL				
Before	0.20±0.40	0.23±0.50		0.77
After	0.13±0.34	0.20±0.40		0.49
Z-value	1.01	0.99		
Mean change, p-value	0.06±0.36, 0.32	0.03±0.18, 0.32		
Monocytes				
Before	0.87±1.71	0.97±1.65	1.02	0.81
After	0.63±1.21	0.47±0.81	1.11	0.53
Z-value	1.23	1.98		
Mean change, p-value	0.23±0.67, 0.07	0.50±0.93, 0.007*		
Lymphocytes				
Before	31.03±8.30	30.37±9.67	0.45	0.77
After	32.30±9.09	30.90±11.28	0.56	0.59
Z-value	2.10	0.56		
Mean change, p-value	1.26±2.14, 0.003*	0.53±2.36, 0.22		
ESR				
Before	21.90±8.53	24.33±7.22	0.86	0.23
After	17.93±4.36	16.07±4.66	0.77	0.11
Z-value	3.46	5.36		
Mean change, p-value	3.96±5.41, 0.001*	8.26±4.74, 0.0001*		

Comparison of Lipid Profile from before to after treatment between the groups

Time interval	Group A	Group B	t-value	p-value
TC				
Before	204.43±22.94	227.10±23.21	10.23	0.0001*
After	190.63±22.41	206.23±22.57	6.23	0.009*
t-value	14.03	13.05		
Mean change, p-value	13.80±7.77, 0.0001*	20.86±15.85, 0.0001*		
TG				
Before	119.73±29.35	200.90±77.35	14.15	0.0001*
After	109.13±28.84	187.77±74.28	11.36	0.0001*
Z-value	15.60	19.01		
Mean change, p-value	10.60±4.90, 0.0001*	13.13±8.31, 0.0001*		
HDL				
Before	41.03±4.22	43.60±5.80	2.03	0.05
After	39.13±4.97	40.67±6.18	0.58	0.29
t-value				
Mean change, p-value	1.90±3.88, 0.12	2.93±2.95, 0.01*		
LDL	1.03	2.13		
Before	130.27±14.23	129.70±13.38	1.02	0.87
After	116.83±14.84	116.67±13.41	0.99	0.96
Mean change, p-value	13.43±7.79, 0.0001*	13.03±7.09, 0.0001*		
t-value	12.06	13.25		
VLDL				
Before	47.57±11.73	34.17±8.43	9.56	0.0001*
After	40.13±10.58	30.63±7.31	8.46	0.0001*
t-value	19.56	20.30		
Mean change, p-value	7.43±4.65, 0.0001*	3.53±2.46, 0.0001*		

Comparison of LFT from before to after treatment between the groups

Time interval	Group A	Group B	t-value	p-value
Serum bilirubin				
Before	0.39±0.20	0.40±0.19	1.03	0.88
After	0.37±0.13	0.39±0.14	1.11	0.57
t-value	0.96	0.78		
Mean change, p-value	0.02±0.15, 0.48	0.01±0.10, 0.70		
Alkaline phosphatatase				
Before	157.53±27.43	142.97±30.79	1.03	0.05
After	154.20±27.79	139.87±30.93	1.13	0.06
t-value	2.13	12.23		
Mean change, p-value	3.33±8.25, 0.03*	3.10±2.65,0.0001*		
SGOT				
Before	28.90±8.50	29.27±7.65	0.99	0.86
After	26.33±7.42	25.83±6.74	1.16	0.78
t-value	12.16	13.12		
Mean change, p-value	2.56±3.30,0.0001*	3.43±3.81,0.0001*		
SGPT				
Before	26.10±9.33	24.60±6.77	0.56	0.47
After	23.80±7.58	22.23±5.21	0.46	0.35
t-value	10.13	11.45		
Mean change, p-value	2.30±2.65, 0.0001*	2.36±2.10, 0.0001*		

*Significant

Comparison of USG finding from before to after treatment between the groups

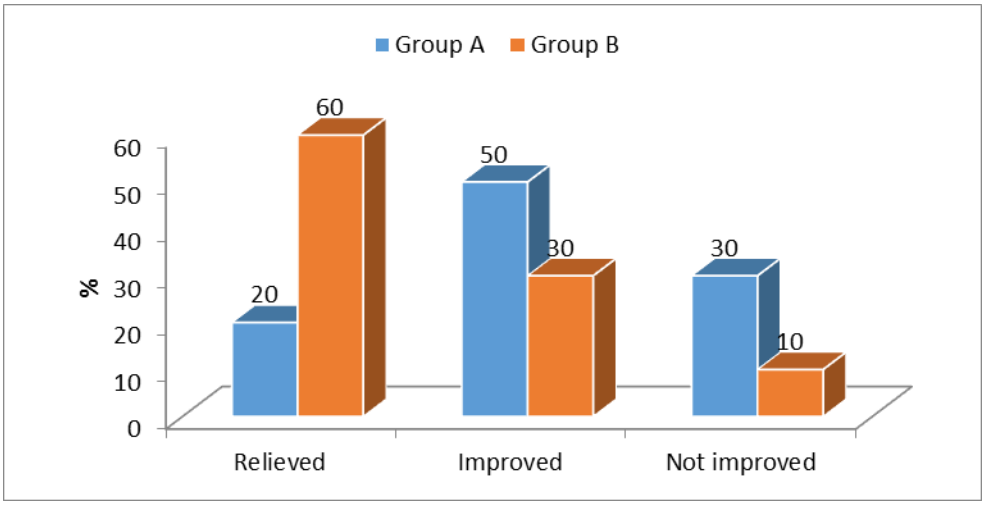
S. No.	USG finding	Group A (n=30)		Group B (n=30)		*p-value*
		No of Patients	%	No of Patients	%	
	Before treatment					
1.	Fatty Liver	10	33.3	10	33.3	0.99
2.	Fatty Liver changes seen	1	3.3	1	3.3	
3.	Fatty Liver with enlarged Hepatomegaly	3	10.0	4	13.3	
4.	Fatty Liver with hepatomegaly	4	13.3	3	10.0	
5.	Fatty Liver with mild hepatomegaly	5	16.7	5	16.7	
6.	Fatty Liver with moderate hepatomegaly	7	23.3	7	23.3	
	After treatment					
1.	Fatty Liver	9	30.0	7	23.3	0.51
2.	Fatty Liver with hepatomegaly	4	13.3	2	6.7	
3.	Normal Liver	17	56.7	21	70.0	

FINAL RESULT

Average %age decrease in severity of symptoms from Day 0 to Day 90, >75%: Highly Improved/Relived.
Average %age decrease in severity of symptoms from Day 0 to Day 90, 45-75%: Improved
Average %age decrease in severity of symptoms from Day 0 to Day 90, <45%: Not Improved

Overall improvement in the severity of symptoms

	Group A (n=30)		Group B (n=30)	
	No.	%	No.	%
Highly Improved	6	20.0	18	60.0
Improved	15	50.0	9	30.0
Not Improved	9	30.0	3	10.0



Overall improvement in the severity of symptoms.

DISCUSSION

The ***Javoparodha*** in body can be attributed to the increase in *guru* & *snigdha bhava*, i.e. *Kapha* and *Meda* in the body. The decrease was explainable due to the reduction in *Atimeda* and clearance of *Srotorodha.* This produces *Laghuta* (lightness) in the body which ultimately reduces *Javoparodha.*

The decrease in the symptom of ***Krichhavyavayata*** in this study may, thus, be attributed to the *srotosodhana* and *dhatvagni dipana* properties of the drugs re-ensuring the physiological functions of the *sukra dhatu*. At the same time, it may be due to the psychological reconstruction in the subjects.

However, modern researchers have studied the relation between weight loss and improvement in sexual functions also.[5]

In *Medoroga*, the metabolism of *Medas* is greatly hampered due to a *Medodhatvagnimandya*. As a result, the *dhaturupa medas* is formed less and *Mala rupa* ***Sweda*** is formed in excess. With the trial regimen, as already seen, this *dhatvagnimandya* is corrected and the normal metabolism process is re-established so that the *Medodhatu* is formed qualitatively and there occurs a decrease in the *Mala rupa Sweda*.

The increase in the symptom polyphagia is explainable in terms of the *Tiksṇa* (minutely penetrating), *Ushna* (hot) and *Dipana* (kindling digestion) properties of the drugs clearing off the *Ama* and the *Srotorodha* and normalizing the physiology of digestion (*Jaṭharagni*) and metabolism (*Dhatvagni*) thereby correcting the **appetite**.

A significant decrease in the symptom ***Daurbalya*** in the present study in both the groups due to an improvement in *Dhatu Poṣaṇa* by the enhanced *Dhatvagnis* and cleared *srotorodha*.

Srotorodha at the *koṣṭha* with a resultant *Vata kopa*. Due to its *Ruksha*, *Shuksham* and *Khara* property of *Vata dosa* this *Vata prakopa* leads to excessive thirst. As the drugs were having the property of clearing off the *Srotorodha*, so normalizing the *Vata kopa*. Thereby correcting the thirst.

By correcting the *Swedabadha* the symptom ***Daurgandhya*** was itself corrected.

Tiksṇa (minutely penetrating), *Usna* (hot) and *Dipana* (kindling digestion) properties of the drugs clearing off the *Ama* and the *srotorodha* and normalizing the physiology of digestion (*Jaṭharagni*) and metabolism (*dhatvagni*). So this lead to reduction in the *Mala rupa Medodhatu*, which is the main cause of **weight** gain in *Medorog.*

Due to reestablishment of the normal physiological functioning of the *Dhatvagnis* the mobilization of the *Ahara rasa* to corresponding *Dhatus* is ensured, thereby yielding a qualitative and quantitative improvement in *Rakta Dhatu* as observed with the increase in **Hemoglobin** concentration.

Increased absorption of triglycerides in intestine may reduce **S. Triglyceride** level.

The change was not significant in between the Groups. **HDL** is considered as good cholesterol because of its effectiveness in cholesterol removal from periphery to liver (reverse cholesterol transport).

A significant ($p<0.05$) decrease was observed from pre to post treatment in **alkaline phosphate, SGOT** and **SGPT.** However, all the changes were within the normal physiological limits confirming the hepato-protective action of the trial drug.

DISCUSSION ON FINAL RESULT

In Group A, 6 patients (20%) were highly improved, 15 patients (50%) were improved and 9 patients (30%) were not improved by administration of the trial drugs.

In Group B, 18 patients (60%) were highly improved, 9 patients (30%) were improved and 3 patients (10%) were not improved by the administration of the trial drugs.

The comparison between Group A and B reveals that the percentage of relieved patients is higher in Group B than in Group A. This difference is statistically significant as (p=0.01), proves that ***Triphala Guggulu*** with ***Punarnavashtaka Kwatha*** has better result on NAFLD than *Triphala Guggulu* with Luke warm water.

Probable mode of action of *Triphala Guggulu* and *Punarnavastak Kwatha*

In *Ayurveda*, the action of drugs is determined on Pharmacodynamic factors as *Rasa, Guna, Veerya* and *Vipaka* along with certain specific properties called *Prabhava (Karma),* which cannot be explained on these principles inherited by the drugs. These drugs in combination act as antagonist to the main morbid factors i.e. *Dosha* and *Dushya* to cause *Samprapti Vighatana* to all of the symptoms of the disease.

a) Triphala Guggulu

Triphala Guggulu is a mixture of: i) *Triphala* (*Haritaki*- Terminalia chebula; *Vibhitaki*- Terminalia bellerica and *Amalaki*- Emblica officinalis) ii) *Pippali* (Piper longum) and iii) *Guggulu* (Commiphora mukul).

Triphala has *Deepaniye* action of improving metabolic fire, *Slesma- pittaghani*, *meha- shothagni* (improving urinary disorders and swelling), *rasayani* (improving rejuvenating power). *Pippali* is *medah-kaphakanashak* (reducing body fat) and *Guggulu* is ati-*lekhana*, *srotassodhaka* (Purifier of the channels).

So the drugs which possess *Lekhaniya* and *Medohara karma* (fat reducing action) would be beneficial in NAFLD patients because they decrease the body fat and thus not only improve lipid profile and BMI but also may be helpful in improving the liver function.

b) Punarnavastak Kwatha

Punarnavastak Kwatha is a mixture of: i) *Punarnava* (Boerhavia diffusa)
(ii) *Nimba* (Azadirachta indica) (iii) *Daruharidra* (Berberis Aristata) (iv) *Haritaki* (Terminalia chebula) (v) *Shunthi* (Zingiber officinale) (vi) *Guduchi* (Tinospora cordifolia) (vii) *Patola* (Trichosanthes dioica) (viii) *Kutaki* (Picrorhiza Kurroa).

Preliminary phytochemical screening revealed the presence of alkaloids, tannins, flavonoids, saponins, and a bitter principle in PNK. Administration of PNK produced significant hepatoprotective effect as demonstrated by decreased levels of serum liver marker enzymes such as aspartate transaminase, serum alanine transaminase, serum alkaline phosphatase, and serum bilirubin and an increase in protein level. It also showed antioxidant activity by increase in activity of glutathione, superoxide dismutase, and catalase and by a decrease in thiobarbituric acid reactive substance level compared with the CCl(4)-treated group.[6] Results of a histopathological study also support the hepatoprotective activity of PNK. Investigation carried out on the HepG2 cell line depicted significant increase in viability of cells.

CONCLUSION

On the basis of above observations it is concluded that *Triphala Guggulu* and *Punarnavastaka Kwatha* are effective in the treatment of *Meda Sanchaya* in liver w.s.r to non alcoholic fatty liver disease (NAFLD).

The data generated facts and figures require further study and clinical trial in greater number of patients to confirm the conclusion with higher confidence and evaluation of the authentic approval.

REFERNCES

1. *Agnivesha, Charak samhita*, edited by pandit kaashinath pandey and gorakhnaath chaturvedi, , Chaukhambha Publication, Varanasi, India, *viman sthan -6/16.*
2. Neuschwander-Tetri BA, Caldwell SH. Nonalcoholic steatohepatitis: summary of an AASLD single topic conference. Hepatology. 2003; 37: 1202–19.
3. Sharangdhar Samhita, Madhya Khanda - 7/82-83.
4. Bhaishajya Ratnawali - 40/33.
5. Professor Gary Wittert. Erectile Function And Libido Improve In Obese Diabetic Men Who Lose Weight. *Journal of Sexual Medicine.* 08 Aug 2011.
6. https://www.ncbi.nlm.nih.gov/pubmed/21391842