

NON ALCOHOLIC FATTY LIVER DISEASE (NAFLD) - AN EMERGING & HIDDEN DISEASE IN ALMOST ALL

Abstract

Non-alcoholic fatty liver disease is becoming prevalent in India and all around the world due to faulty food style and low physical activity. This chapter provides a deep insight into the Non-alcoholic fatty liver disease on the causes, symptoms and path physiology thus a deep comprehensive cover on the topic. Physiotherapy exercises and testing is been described in the shorter format for the easy understanding.

Author

Dr R. Sedhunivas
M.P.T., Cardio
Assistant Professor
School of Health Sciences
Department of Physiotherapy
Garden City University
Bangalore, Karnataka, India

Liver is the largest organ in the body and secretes bile and known as metabolic factory of the body as various chemical reactions takes place. It is only organ which can grow on other body after being transplanted within few weeks.

I. NAFLD- DEFINITION

NAFLD (Nonalcoholic Fatty Liver Disease and Nonalcoholic Steatohepatitis) is a condition defined by excessive fat accumulation in the form of triglycerides (steatosis) in the liver, which left untreated eventually might lead to liver failure- WORLD GASTROENTEROLOGY ORGANIZATION.

II. WHY NAFLD - A HIDDEN DISEASE??

NAFLD comprises of many stages starting from simple fat deposition or accumulation and slowly progress eventually to liver failure. There are no signs and symptoms in simple fatty liver (first stage of NAFLD). It is mostly noticed during regular master health checkup scans and this condition manifests with symptoms and signs only when the inflammatory stage progresses (steatohepatitis). Recent trends in food and physical activity cause this particular condition

III.AETIOLOGY

- Fatty diet (leads to rise Low Density Cholesterol and triglycerides levels)
- Lack of physical activity and exercise

IV.RISK FACTORS

- Hyperglycemia
- Polycystic ovary syndrome
- Hypothyroidism
- Central abdominal obesity

V. DIFFERENCE BETWEEN NAFLD VS. OBESITY

- 1. NAFLD:** It is a manifestation of obesity and it is associated with visceral fat deposition more compared to subcutaneous fat deposition. It has two types lean (NAFLD) and obese (NAFLD).
- 2. Obesity:**The probable cause is due to increase deposition of fatty substances under adipose tissue due to faulty metabolism in various areas. It has two type's mainly central or abdominal obesity and peripheral obesity.

VI. DIFFERENCE BETWEEN NAFLD VS. AFLD

- 1. NAFLD:** NAFLD is associated with zero to fewer amounts of alcohol intake and common among all types of people. It is also associated only with faulty diet and lack

of physical activity. Fatty degeneration of cells occurs to more degree in this condition

- 2. AFLD (Alcoholic Fatty Liver Disease):** AFLD is associated with chronic alcohol intake and it is common disease among alcohol drinkers and mainly exaggerated by fatty diet and lack of physical activity. Fatty degeneration of cells occurs to less degree in this condition.

VII. STAGES OF NAFLD AND ITS PROGRESS:

- **Stage 1: Simple Fatty Liver**
There is fat deposition on the surface of liver (>5%) with no hepatocellular ballooning with no inflammation of hepatocytes.
- **Stage 2: Non-Alcoholic Steatohepatitis (NASH)**
Increased fat build-up (>25%) with hepatocellular ballooning and with no evidence of fibrosis
- **Stage 3: Fibrosis of Liver**
Liver develops scar tissue due to chronic inflammatory process which reduces the function of liver.
- **Stage 4: Cirrhosis of Liver**
A chronic progressive disease characterised by extensive degeneration of liver parenchymal cells with abnormal nodules in liver.
- **Stage 5: Decompensated Liver Cirrhosis**
Acute deterioration of liver function in patients with cirrhosis and manifests as jaundice, ascites, hepatic encephalopathy. Mortality can occur in both cirrhosis and decompensated stage as well associated with existing comorbidities.

1. Symptoms and Signs

- No significant symptoms and signs
- Presents with obesity

VIII. DIAGNOSIS- INVESTIGATIONS

- 1. Ultrasound Scan of Abdomen:** Non-invasive tool, accurate tool in detection of NAFLD. Ultrasound will reveal a diffused echogenic texture pattern – considered as a gold standard for NAFLD diagnosis. Normal echo texture pattern is seen in normal population without NAFLD. Scan is done in anterior, lateral, posterior part of right upper abdomen with patient in side lying position preferably
- 2. Lipid Profile- Biomarkers:** The amount of obesity can be measured by LDL, HDL, Triglycerides value, LDL/HDL ratio. The elevated levels indicates the severity of obesity which will directly impact the liver

3. Liver Function Tests:

- Bilirubin (0.3-1.2 mg/dl)
- Aspartate aminotransferase- AST (<35 U/L)
- Alanine aminotransferase- ALT (<45 U/L)
- Alkaline phosphatase- (53-128 U/L)

In first stage of NAFLD, there won't be elevation of liver biomarkers. When the period of inflammation starts, there is increase in the level of liver biomarkers. When the liver is in irreversible stage of cirrhosis, biomarkers rises to alarming levels of elevation.

4. **Liver Biopsy:** It will be recommended to determine whether patient is in inflammatory stage (NASH). Recommended as a part of differential diagnosis to rule out other disease (jaundice- where liver biomarkers are elevated)

5. Other Investigations:

- **CT Scan :** combination of x-rays & computer technology to create images of liver
- **MRI Scan :** Radio waves & magnets to produce detailed images of organs & soft tissues without using x-rays
- **Elastography:** imaging test that can help determine if you have advanced liver fibrosis.

6. **Prognosis of NAFLD:** Early intervention is essential. NAFLD is reversible with the effort of increasing physical activity, exercise and in late stages with medications. But prognosis becomes difficult when it comes to NASH, where the inflammation process as already started and it is irreversible.

7. Complications of NAFLD:

- Hepatic complications
- Extra hepatic complications (Wataru Tomeno et. Al 2020)
 - Chronic kidney disease
 - Gastro esophageal reflux
 - Obstructive sleep apnea
 - Hypothyroidism

8. Medical Intervention in NAFLD:

- **Pharmacological Therapy**
 - **Insulin Sensitizers:** metformin, thiazolidinedione's, incretin-based therapies
 - **Lipid-Lowering Agents:** statins, fibrates, PUFA
 - **Cytoprotective and Antioxidant Agents:** URSO, Vitamin E, silymarin, betaine
 - **Anti-TNF- α Agents:** Pentoxifylline, monoclonal antibodies.

9. Physiotherapy Evaluation in NAFLD:

- BMI
- Waist circumference
- Skin fold thickness
- Bioimpedence analyzer
- Exercise testing

Protocols used in obesity and sedentary individuals can be used as exercise testing for NAFLD.

- **Field Test:** Six minute walk test, 12 minute walk test
- **Treadmill Protocol:** Modified Bruce protocol

IX. EXERCISE RECOMMENDATIONS

| Aerobic Exercises | Recommendations |
|-----------------------------|---------------------------------|
| Frequency | 3days/Week |
| Intensity | 60%-80% Of THR |
| Time | 30-40mins |
| Type | Track Walking, Jogging, Running |
| | |
| Resistance Exercises | Recommendations |
| Frequency | 3 Days/Week |
| Intensity | 1- RM |
| Time | 10 Reps X 3 Sets |
| Type | Free Weights |
| | |
| Flexibility Exercises | Static Stretching |

THR-“Target Heart Rate”; RM-“Repetition Maximum”; Reps-“Repetitions”

