

## Pediatric Nonalcoholic Fatty Liver Disease (NAFLD)

Separating the Foie from the Gras

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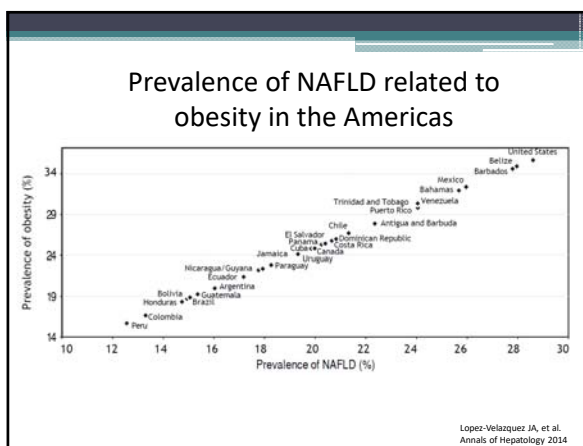


### Objectives

1. Describe the differences between NAFLD and NASH
2. Identify which patients should be screened for NAFLD
3. Understand the implications of the diagnosis of NAFLD or NASH in terms of treatment and prognosis

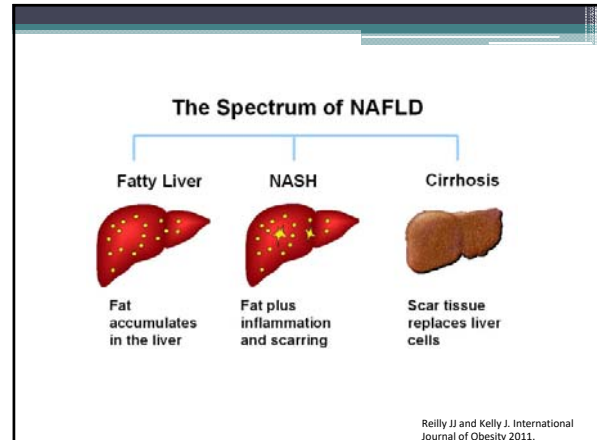
### Nonalcoholic Fatty Liver Disease

- Chronic liver disease
- Most common liver disease in children in the US
- Can result in progressive fibrosis and end-stage liver disease
- One of the leading indications for transplant in adults



## NAFLD – Spectrum of Disease

- Fatty infiltration (>5%) in the liver, absence of other diseases
- Histology delineates:
  - **NAFL** – steatosis without steatohepatitis
  - **NASH** – hepatic steatosis with inflammation
- Can progress over time

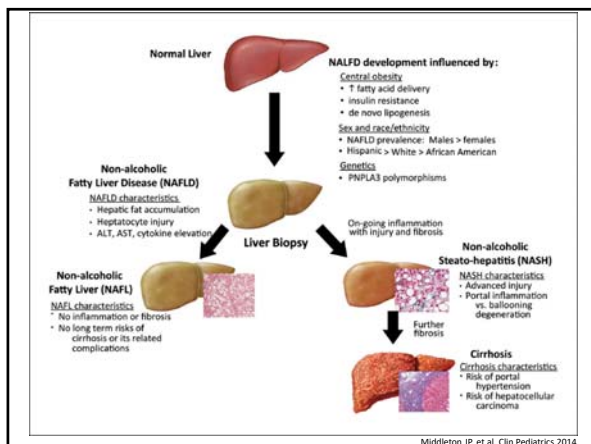


## Epidemiology

- Exact incidence and prevalence in children unknown
  - ~ **10% of children**
  - **17% of teenagers and 40+ % of obese children**
- Race/ethnicity
  - **Hispanic > Caucasian and Asian > African American**
- Male > female
- OSA, pan hypopituitarism, Type 2 DM

## Pathophysiology

- Not all NAFLD is equal
- Pediatric onset likely more aggressive
- In most kids with NAFLD, associated insulin resistance, central/generalized obesity, and dyslipidemia
- ? why some progress to NASH and cirrhosis



## Screening for NAFLD

**Why?**

- Detect disease prior to the onset of irreversible, end-stage liver disease
- Disease is often asymptomatic
  - Acanthosis, increased waist circumference, hepatomegaly
- Implications for treatment

## Who to Screen?

- All obese children age 9-11 years
- All overweight children with additional risk factors
- Consider in younger patients with risk factors

**RISK FACTORS**

- Central adiposity
- Insulin resistance
- Pre-diabetes or diabetes
- Dyslipidemia
- Sleep apnea
- Family history

## Who to Screen?

- Screening of siblings and parents of children with NAFLD if known risk factors
- If initially normal, consider repeating every 2-3 years or if risk increases

## How to Screen

- Alanine aminotransferase (ALT) – inexpensive
- Assay standardized between facilities
- Reporting of normal values is not



## SAFETY Study

- Screening for ALT Elevation in Today's Youth
  - **Acute care hospitals, NHANES 1999-2006, +/-NAFLD, chronic Hep B and Hep C**
- Median upper limit of ALT at Children's Hospitals was 53 U/L
- 95<sup>th</sup> %ile for ALT in healthy kids = 25.8 U/L for boys and 22.1 U/L for girls

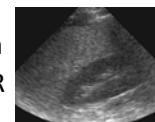
Schwimmer JB, et al. Gastroenterology 2010.

## Laboratory Screening

- 2x ALT in overweight and obese children 10+ years
  - **Sensitivity of 88%, specificity of 26% for NAFLD**
- NASH more common when ALT  $\geq$  80 (41% vs 21%)

## Imaging

- Abd US  $\rightarrow$  poor for detection and quantification
- MRI and MR spectroscopy  $\rightarrow$  validated and accurate, but not widely used
- CT  $\rightarrow$  high specificity, radiation
- Transient elastography and MR elastography  $\rightarrow$  estimate liver stiffness

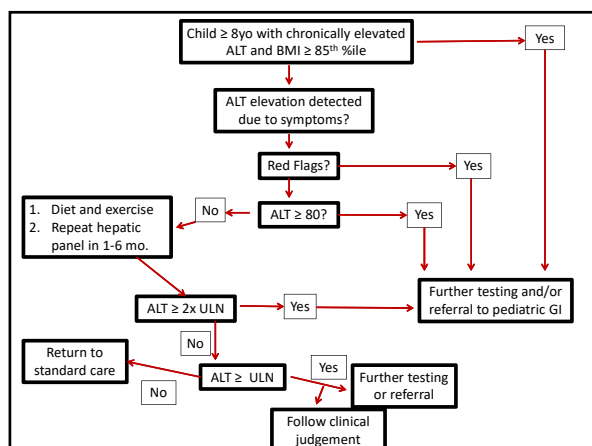


## Take Home - How to Screen

- ALT/hepatic panel – best noninvasive biomarker
- US should not be done for screening

## When to Refer

- ALT persistently elevated (> 3 months) >2x ULN → should be evaluated for NAFLD and other causes of hepatitis
- ALT ≥ 80 = increased clinical concern and timely evaluation



## Diagnosis

- NAFLD = diagnosis of exclusion
  - Non-invasive testing not accurate or validated enough to be useful
  - US not helpful for diagnosis
- Rule out other causes
- Consider liver biopsy

## Treatment

- All children → lifestyle intervention counseling if overweight or obese
- Goals:
  - Regression of NAFLD: ↓ steatosis, inflammation, fibrosis
  - Resolution of NASH
  - ? Decrease in ALT
  - Liver biopsy is clinical standard, risks/benefits must be weighed



## Treatment studies

- Improvement in noninvasive markers with dietary changes + ↑ physical activity
- Multidisciplinary lifestyle approaches (**>25 contact hrs over 6 months**) = most effective
- In adult studies, loss of >10% of baseline wt was associated with >90% resolution of NASH
- No specific diet, though reduce sugary drinks



## Treatment

- No currently available meds or supplements are recommended to treat Pediatric NAFLD
- Weight loss surgery may help if the patient meets criteria
- Protect the liver



## Take Home Points

- NAFLD is the most common liver disease in US kids
- Encompasses NAFL and NASH – can progress to fibrosis, cirrhosis
- Screen all obese kids 9-11 and overweight kids with risk factors – screen with ALT
- If persistently elevated ALT – refer for further evaluation
- Counsel on lifestyle management strategies
- Weight loss = most effective

Thank you!



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