

Non-Alcoholic Steatohepatitis and Obesity

BY DIANA MOYA, MD

Obesity and Non-alcoholic steatohepatitis (NASH) are fascinating entities becoming more frequent in our practice. During the past two decades, there has been a dramatic increase in obesity in children and adolescents in the United States. Data from the CDC estimates that childhood obesity has more than doubled in children and tripled in adolescents in the past 30 years, and approximates 17% (12.5 million). Parental obesity is one of the main risk factors for the development of pediatric obesity. Obese adolescents have a 50 to 77% risk of becoming obese adults with an increase to approximately 80% given 1 obese parent.

Obesity during childhood carries devastating consequences including hypertension, dyslipidemia, non-alcoholic fatty liver disease (NAFLD), insulin resistance, diabetes mellitus and metabolic syndrome. Children are at greater risk for bone and joint problems, sleep apnea, precocious puberty, polycystic ovary syndrome and social and psychological problems such as poor self-esteem and bullying.

Many families, surprisingly enough, report being unaware that their child is overweight or obese. This unawareness limits interventions in a timely fashion. As physicians and medical care providers, we must warn families for any concerns about overweight and obesity at any age. Body fat is measured by Body Mass Index (BMI) based on height and weight. BMI curves are calculated from the 5th to the 95th percentile and by consensus children and adolescents are overweight or obese if the BMI exceeds the 85th or 95th percentiles respectively.

Obesity can be multifactorial involving genetic and environmental factors. In overweight and obese children, excess fat accumulates when total energy intake exceeds total energy expenditure. Other factors include genetic syndromes, hormonal disorders, and medications.

NAFLD occurs more frequent in obese children. NAFLD is a spectrum of diseases ranging from simple steatosis to cirrhosis. Non-alcoholic steatohepatitis (NASH) is the severe form of NAFLD and is characterized by steatosis, hepatocyte injury and cell death, inflammation and collagen deposition or fibrosis of the liver. The pathogenesis of NASH is not fully understood, although metabolic derangements related to obesity, insulin resistance and oxidative stress is well known factors involved. The development of NASH is likely a "two hit" process. Fat accumulation in the hepatocytes is the suggested "first hit". The "second hit" is related mainly to oxidative stress, and additionally mitochondrial dysfunction, pro-inflammatory cytokines, and adipokines that leads to the production of reactive oxygen species.

Most obese children with NASH are asymptomatic. Few patients may complain about fatigue and upper abdominal discomfort. Although the only finding on physical exam may be a BMI above the 85th or 95th percentiles, other findings may indicate organic etiologies

of obesity. Short stature may suggest hypothyroidism, hormonal abnormalities or genetic syndrome such as Prader-Willi syndrome. Constipation or intolerance to cold may indicate hypothyroidism. Polyuria and polydipsia may suggest diabetes. Acanthosis nigricans suggests insulin resistance. Symptoms of jaundice, ascites, edema or hepatosplenomegaly may be signs of advance liver disease related to cirrhosis due to progressive NASH.

Laboratory evaluation may be challenging as no single test is used to diagnose NASH. Helpful tests includes liver function tests, gamma-glutamyl transpeptidase, fasting insulin and glucose levels, fasting lipid panel, thyroid panel and iron studies. Occasionally more specialized tests are used to rule out other causes of elevated liver enzymes such as autoimmune or infectious hepatitis, Wilson's disease or hemochromatosis.

Abdominal ultrasound is a helpful, simple and noninvasive way to diagnose hepatic steatosis and evaluate for portal hypertension or gallbladder disease. In patients with NASH, the liver is hyperechogenic or bright and steatosis is usually detected when more than 30% of liver has fatty changes. Other diagnostic studies also available are abdominal computed tomography and magnetic resonance. Invasive tests such as a liver biopsy should be considered in patients with suspected NASH to assess the extent of liver damage and fibrosis, define the prognosis and exclude other unsuspected causes of liver disease.

No specific treatment is available for (NASH). Lifestyle modification including weight loss, dietary changes, and exercise activity are the most important measures to slow the progression of the disease and reverse hepatic steatosis. According to the AASLD guidelines, 2-3% of weight loss generally reduces hepatic steatosis, but up to 10% weight loss may be needed to improve necroinflammation.

Recommendations for pharmacological therapies such as metformin, statins, ursodeoxycholic acid, thiazolidinediones, omega-3 fatty acids and vitamin E in children are limited and therefore not recommended for this population.

Some complications associated with NASH may include cirrhosis and its complications: variceal bleeding, ascites, encephalopathy, and liver failure. The prognosis in NASH depends on the histologic stage at presentation. The rate of progression worsens if more than one liver disease is present (alcoholic liver disease or chronic viral hepatitis).

At GI for Kids, we offer a weight management program, Bee Fit 4 Kids, for overweight and obese children and teenagers. Bee Fit comprises group and individual counseling sessions with two Registered Dietitians to discuss healthy dietary habits, an Exercise Specialist to improve physical activity habits, and a Psychologist assessing behavior modification to ensure a successful weight loss journey. Our Gastroenterologists and Nurse Practitioners also participate in this program.



GI for Kids, PLLC

www.giforkids.com (865) 546-3998