Continued elevation of liver tests following HCV Eradication

Jesse Powell PA-C

Gastroenterology and hepatology

Hennepin Healthcare

Objectives

- Define what true normal ranges are and what levels are safe to monitor
- Demonstrate a stepwise approach to elevated liver tests based on pattern of injury and degree of elevation
- Identify tests indicated for common causes of elevated liver tests

Pre DAA era

- Everyone underwent work up for other causes of liver disease
  - Autoimmune hepatitis in particular
- Everyone underwent a liver biopsy

DAA era

- Noninvasive fibrosis staging
  - Limiting factor – no path
- Liver tests elevated but in line with HCV infection
  - Wait and reassess following eradication
- **What levels are safe to monitor?**
  - Borderline elevations $\leq$ 2 x ULN
  - Mild elevations 2-5 x ULN
  - Moderate elevations 5-15 x ULN
  - Severe elevations >15 x ULN
  - Massive elevations ALT >10,000 U/L

When and how often should you monitor liver tests following treatment?

- **From the AASLD simplified guidelines for non cirrhotics**
- **Post-Treatment Assessment of Cure (SVR)**
- Assessment of quantitative HCV RNA and a hepatic function panel are recommended 12 weeks or later following completion of therapy to confirm HCV RNA is undetectable (virologic cure) and transaminase normalization.
- Assessment for other causes of liver disease is recommended for patients with elevated transaminase levels after achieving SVR.

True normal values for transaminase

- Female below 20-25
- Male below 30-35

I checked them at SVR 12 and they are still elevated!

- What is the pattern of injury
- What is the degree of injury
- HBcAb positive?
- Any ongoing alcohol use?
- Metabolic syndrome?
- Concerning medications or supplements?
- Toxins?

Causes of elevated transaminase elevations (hepatocellular injury)

- AST > ALT
  - **Alcohol**
  - **Cirrhosis**
  - Congestive hepatopathy
  - Ischemic hepatitis
- ALT >AST
  - **Steatotic liver disease (SLD)**
  - Viral hepatitis
  - **Medications/supplements**
  - Toxins
  - **Hemochromatosis**
  - **Autoimmune hepatitis**
  - **Wilsons Disease**
  - **Alpha 1 antitrypsin deficiency**

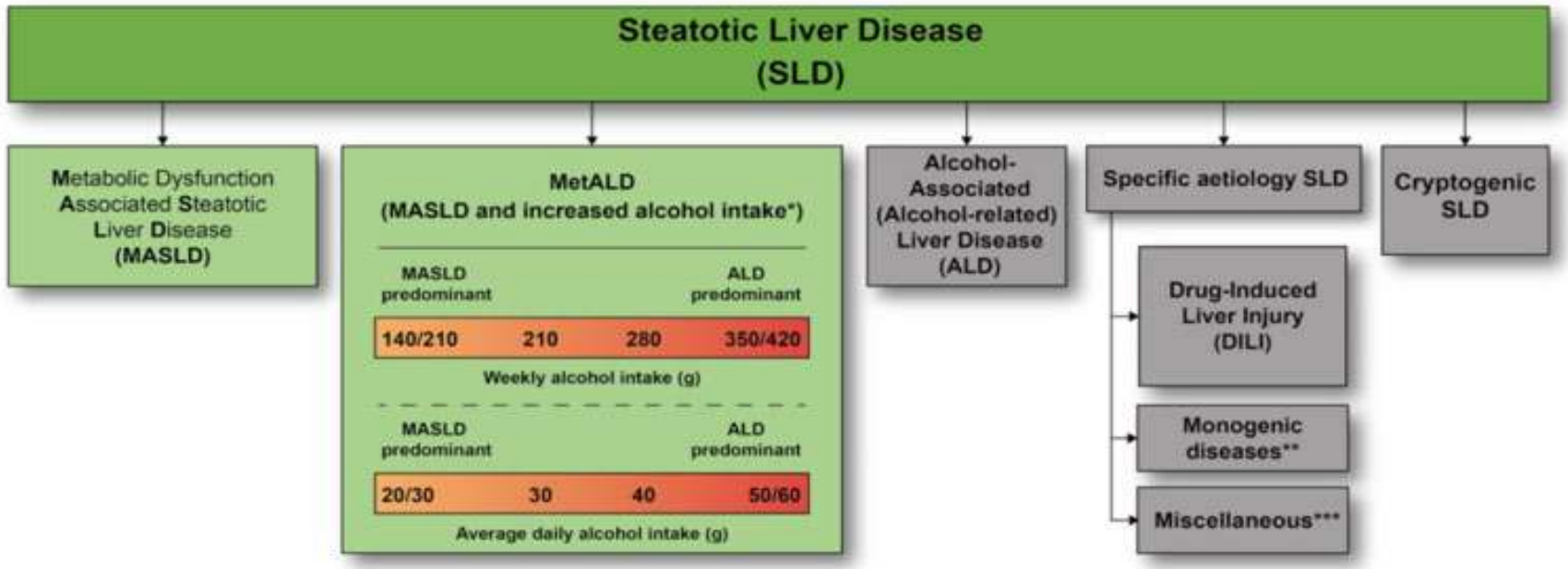
Non hepatic causes of elevated transaminase

- Skeletal muscle damage
- Cardiac muscle damage
- **Thyroid disease**
- Hemolysis

New nomenclature for NAFL

- Metabolic dysfunction –associated steatotic liver disease (MASLD)
- Metabolic dysfunction-associated steatohepatitis (MASH)
- MetALD – MASLD with alcohol overuse (140 g/week and 210g/week for females and males respectively)

Steatotic Liver Disease Sub-classification



*Weekly intake 140-350g female, 210-420g male (average daily 20-50g female, 30-60g male)
**e.g. Lysosomal Acid Lipase Deficiency (LALD), Wilson disease, hypobetalipoproteinemia, inborn errors of metabolism
***e.g. Hepatitis C virus (HCV), malnutrition, celiac disease

This depicts the schema for Steatotic Liver Disease (SLD) and its sub-categories. SLD, diagnosed histologically or by imaging, has many potential etiologies. MASLD, defined as the presence of hepatic steatosis in conjunction with one CMRF and no other discernible cause, ALD, and an overlap of the 2 (MetALD), comprise the most common causes of SLD. Within the MetALD group there exists a continuum across which the contribution of MASLD and ALD will vary. To align with current literature, limits have been set accordingly for weekly and daily consumption, understanding that the impact of varying levels of alcohol intake are evolving. Other causes of SLD need be considered separately, as is already done in clinical practice, given their distinct pathophysiology. Multiple etiologies of steatosis can coexist. If there is uncertainty and the clinician strongly suspects metabolic dysfunction despite the absence of CMRF then the term possible MASLD can be considered pending additional testing (e.g., HOMA-IR, OGTT). Those with no identifiable cause (cryptogenic SLD) may be recategorized in the future pending developments in our understanding of disease pathophysiology. Lastly, the ability to provide an affirmative diagnosis allows for the coexistence of other forms of liver disease with MASLD, e.g., MASLD + autoimmune hepatitis or viral hepatitis.

Citation : Rinella ME, Lazarus JV, Ratziu V, et al. A multi-society Delphi consensus statement on new fatty liver disease nomenclature. *Hepatology*. Published online June 24, 2023. doi:10.1097/HEP.0000000000000520

Autoimmune hepatitis

- Anti-nuclear antibody (ANA)
- Smooth muscle antibody (ASMA)
- Immunoglobulin G total (IgG total)

Hemochromatosis

- Ferritin
- Iron panel (want iron sat)
- Ferritin elevated or iron sat over 45%
  - HFE gene mutation analysis
    - C282Y homozygotes

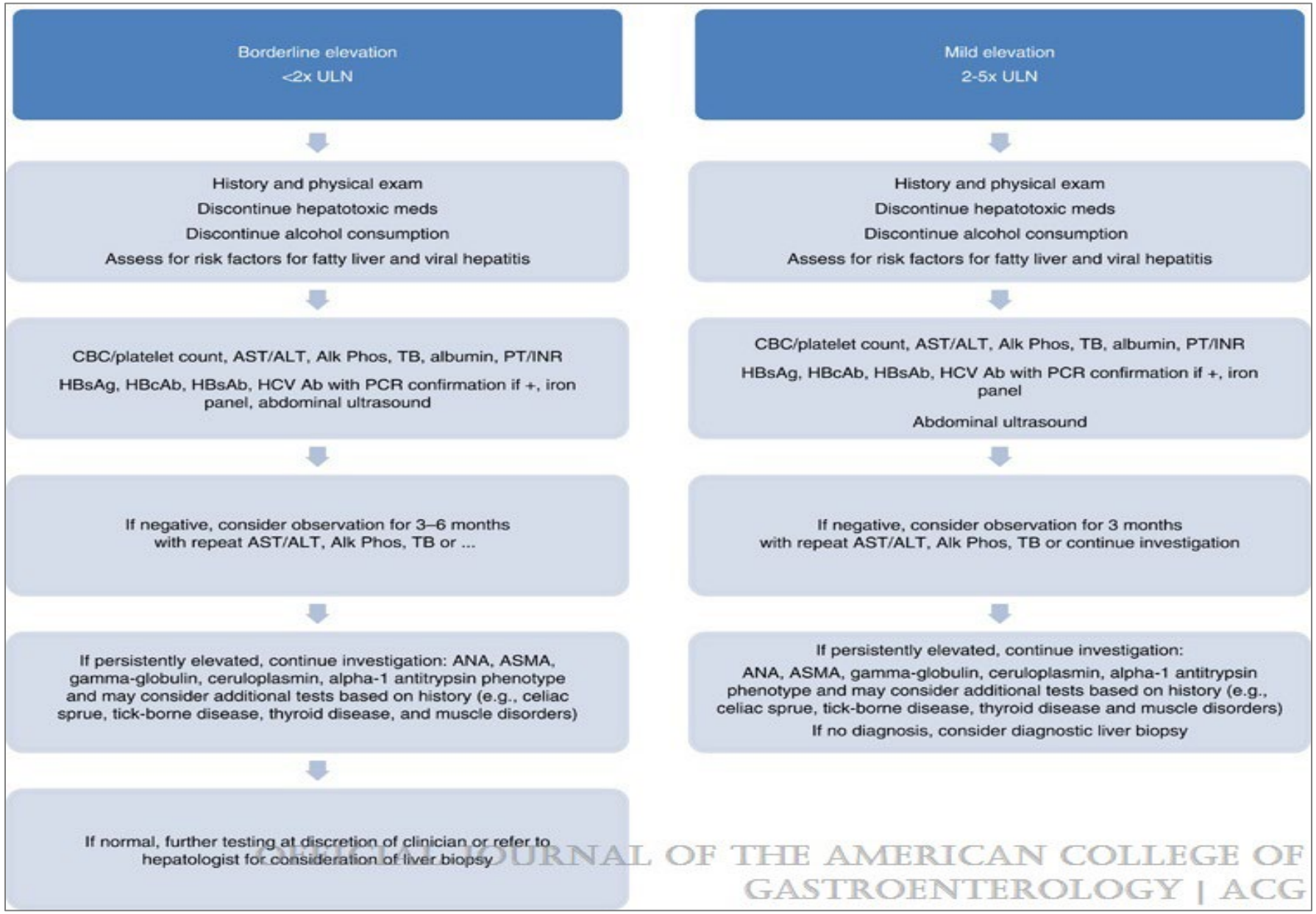
Alpha 1 antitrypsin deficiency

- Alpha 1 antitrypsin level
  - Low check genotype (PiZZ and PiMZ)

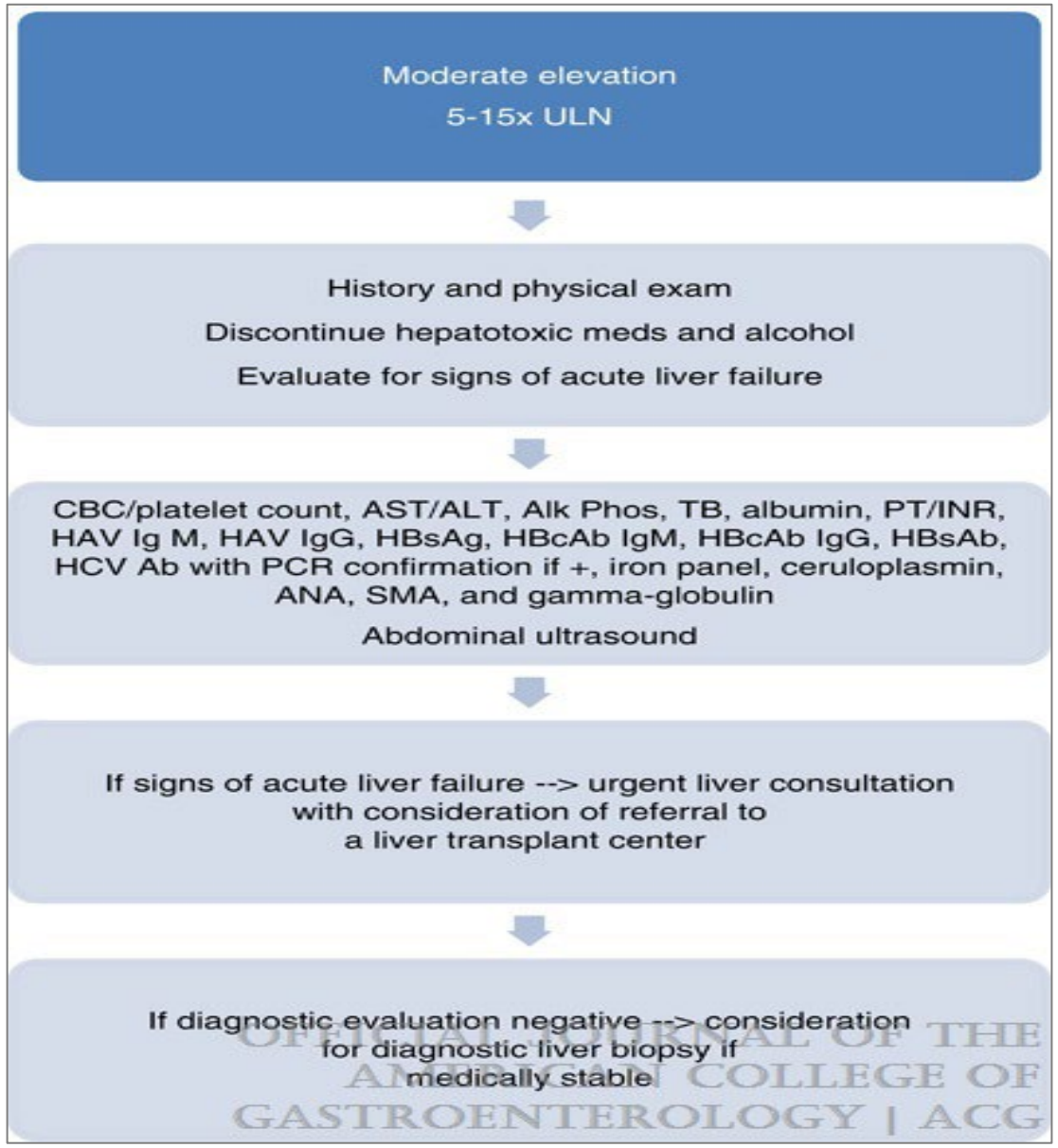
Wilsons disease

- Ceruloplasmin
  - Low then get 24 hour urine copper, serum copper, slit lamp exam for Kayser-Fleischer rings

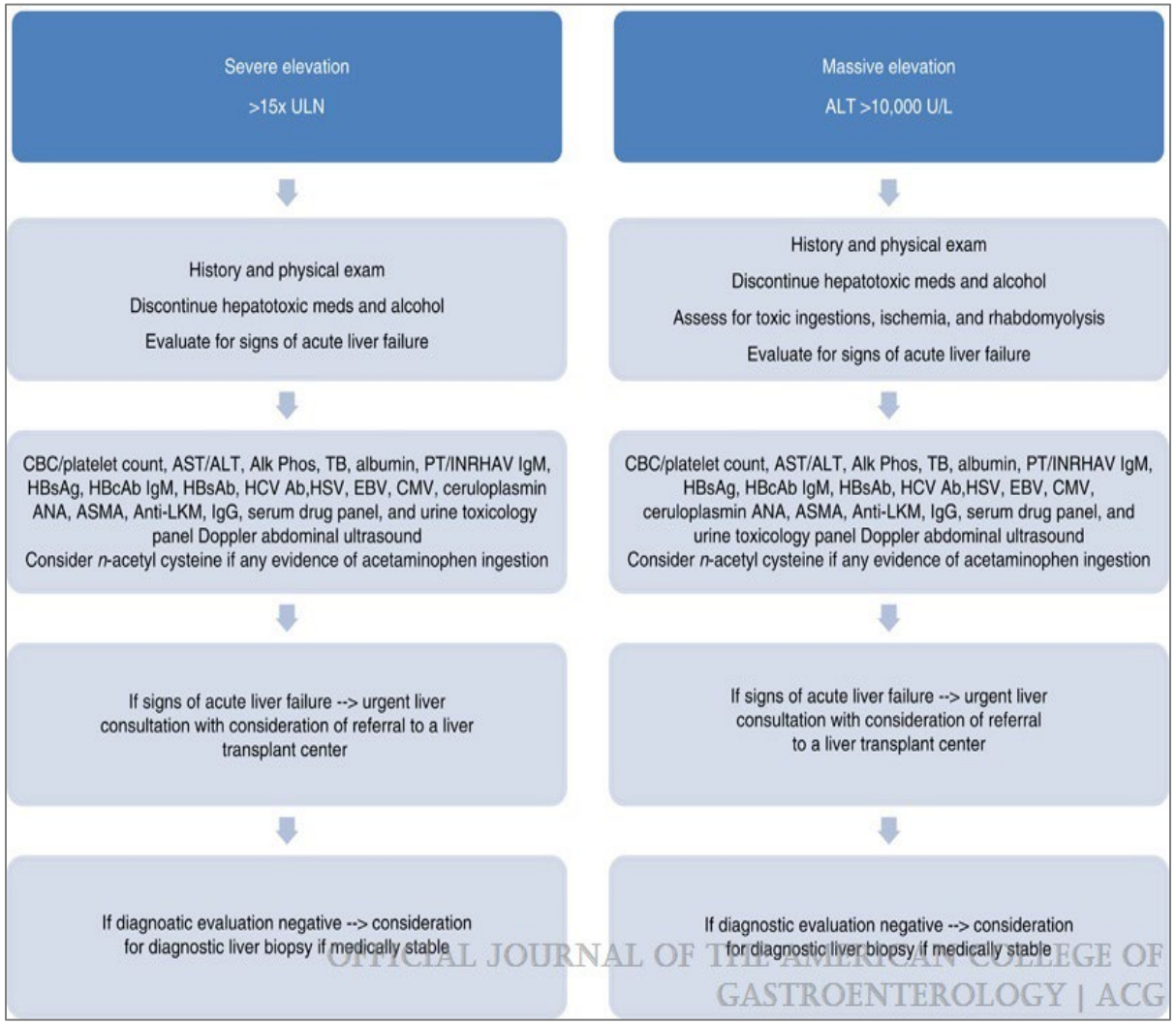
ACG Guideline for the work up for borderline to mild transaminase elevations



ACG guidelines for moderate transaminase elevations



ACG Guidelines for severe and massive transaminase elevations



Causes of elevated alk phos

- Hepatobiliary
  - **Choledocholithiais**
  - **Malignancy** (obstruction of infiltration
  - Bile duct fluke
  - **Primary sclerosis cholangitis (PSC)**
  - **Primary Billiary cholangitis (PBC)**
- **Medications**
- Infiltrative
  - **Sarcoidosis**
  - Amyloidosis
  - TB
- Viral hepatitis
- **Cirrhosis**
- **Alcohol**
- CHF

- Non hepatic causes
  - **Bone disease**
  - Hyperthyroid
  - Chronic renal failure
  - Gastric ulcer
  - Blood type O and B
  - Extrahepatic malignancy
  - Influx of alk phos after a fatty meal

Isolated alk phos elevation?

- Alk phos isoenzymes vs GGT
  - Isoenzymes provide origin
  - GGT – also elevated with alcohol overuse

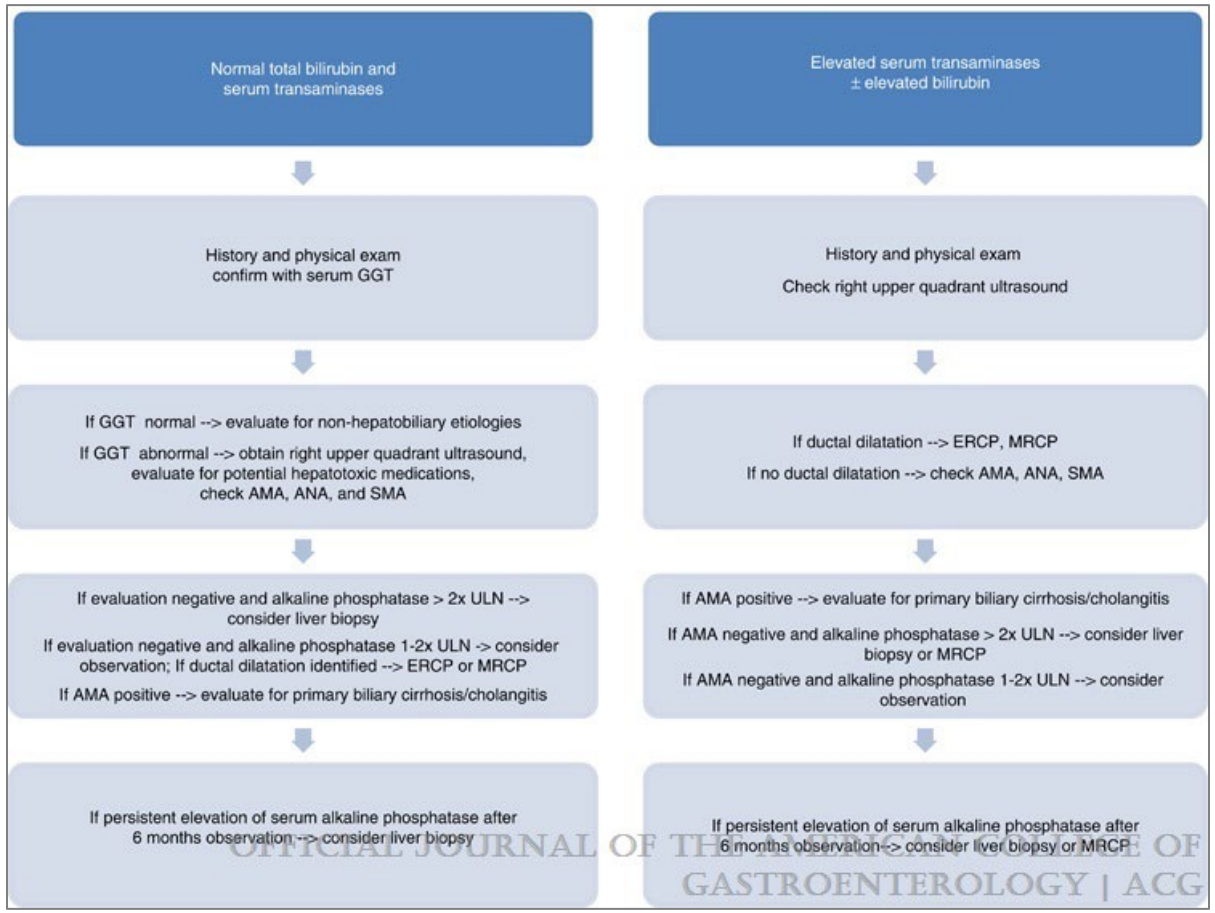
PBC

- Antimitochondrial antibody
- Immunoglobulin M total (IgM total)

PSC

- No specific serologies
- Diagnosed with MRCP or ERCP

Figure 4.



[ACG Clinical Guideline: Evaluation of Abnormal Liver Chemistries]

Kwo, Paul Y; Cohen, Stanley M; Lim, Joseph K

Official journal of the American College of Gastroenterology | ACG112(1):18-35, January 2017.

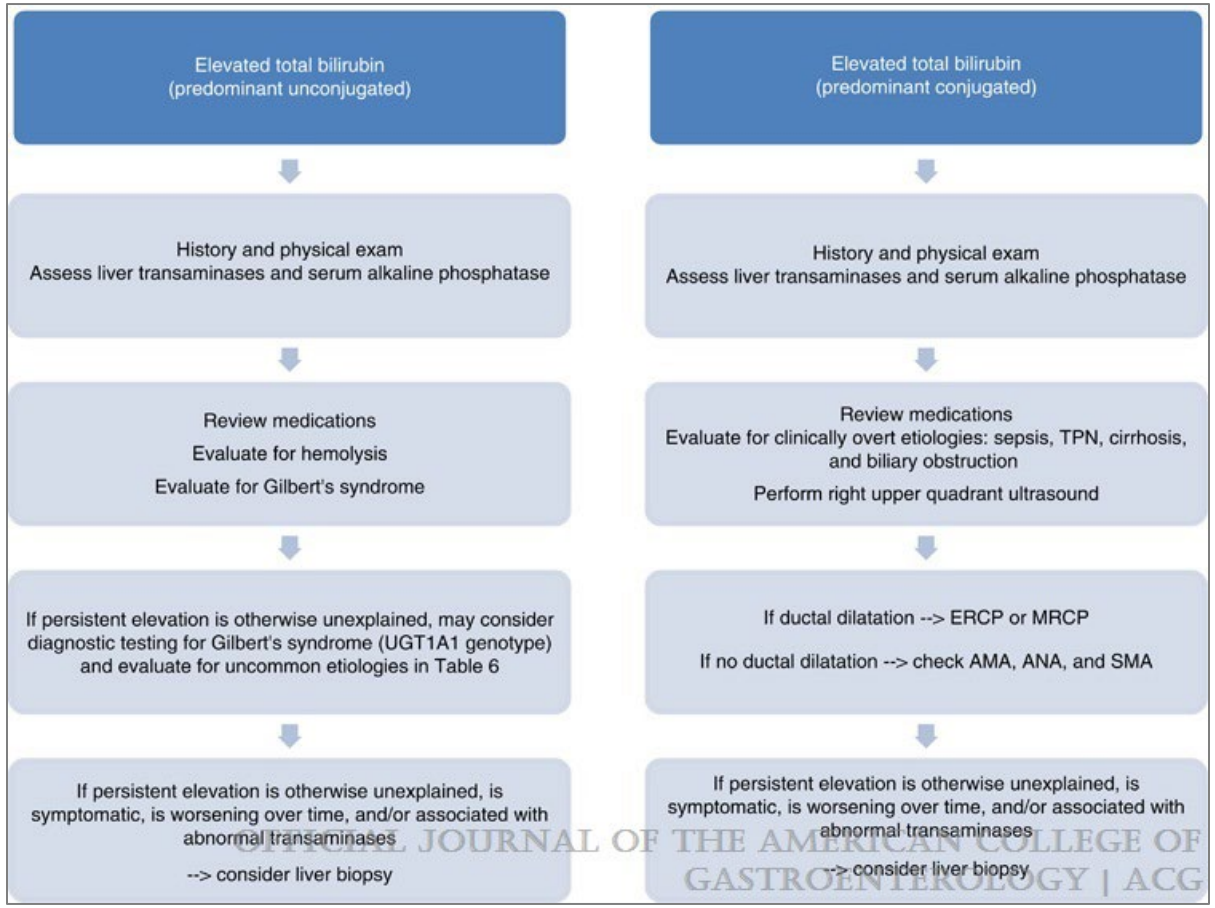
doi: 10.1038/ajg.2016.517

Algorithm for evaluation of elevated serum alkaline phosphatase.

Causes of elevated bilirubin

- Unconjugated
  - **Gilberts syndrome**
  - Crigler-Najjar syndrome
  - **Hemolysis**
  - **Medications**
  - Hyperthyroidism
- **Conjugated**
  - **Bile duct obstruction**
  - Bile duct stricture
  - Viral hepatitis
  - **Medications**
  - Cirrhosis
  - **PSC**
  - **PBC**
  - **Infiltrative disease**
  - **Malignancy**
  - Wilsons
  - Autoimmune hepatitis
  - **Dubin-Johnson syndrome**
  - Rotor Sysndrome

Figure 5.



[ACG Clinical Guideline: Evaluation of Abnormal Liver Chemistries]

Kwo, Paul Y; Cohen, Stanley M; Lim, Joseph K

Official journal of the American College of Gastroenterology | ACG112(1):18-35, January 2017.

doi: 10.1038/ajg.2016.517

Algorithm for evaluation of elevated serum total bilirubin.