

Care Step Pathway – Hepatotoxicity (immunotherapy-induced inflammation of liver tissue)

Assessment

Look:

- Does the patient appear fatigued or listless?
- Does the patient appear jaundiced?
- Does the patient have yellowing of eyes?
- Does the patient appear itchy?
- Does the patient appear diaphoretic?
- Does the patient have any ascites?

Listen:

- Change in energy level?
- Change in skin color? Yellowing?
- Change in stool color (paler)?
- Change in urine color (darker/tea colored)?
- Abdominal pain: specifically, right upper quadrant pain?
- Bruising or bleeding more easily?
- Fevers?
- Increased itching?
- Change in mental status?
- Increased sweating?

Recognise:

- Elevation in LFTs
 - o AST/SGOT
 - o ALT/SGPT
 - o Bilirubin (total/direct)
- Alteration in GI function
- Symptoms such as abdominal pain, ascites, somnolence, and jaundice
- Other potential causes (viral, drug toxicity, disease progression)

Grading Toxicity: ULN

Grade 1 (Mild)

AST or ALT: >1.0× – 3.0× ULN
Bilirubin: >1.0× – 1.5× ULN

Grade 2 (Moderate)

AST or ALT: >3.0× – 5.0× ULN
Bilirubin: >1.5× – 3.0× ULN

Grade 3 (Severe)

AST or ALT: >5.0× – 20.0× ULN
Bilirubin: >3.0× – 10.0× ULN

Grade 4 (Potentially Life-Threatening)

AST or ALT: >20× ULN
Bilirubin: >10× ULN

Grade 5 (Death)

Management of Transaminitis (without elevated bilirubin)

Management of Grade 2 or worse transaminitis with bilirubin >1.5× ULN: follow Grade 4 recommendations

Overall Strategy:

- LFTs should be checked and results reviewed prior to each dose of immunotherapy
- Rule out infectious, non-infectious, and malignant causes. Consider assessing for new onset or re-activation of viral hepatitis, medications (acetaminophen, statins, and other hepatotoxic meds, or supplements/herbals), recreational substances (alcohol); consider disease progression

Infliximab infusions are not recommended due to potential hepatotoxic effects

Grade 1 (Mild)

- Continue immunotherapy; recheck LFTs within ~ 1 week

Grade 2 (Moderate)

- Immunotherapy to be withheld; recheck LFTs daily x 3 days or every 3 days; to be resumed when complete/partial resolution of adverse reaction (Grade 0/1)
- Immunotherapy to be discontinued for Grade 2 events lasting ≥6 (ipilimumab) or ≥12 weeks (pembrolizumab, nivolumab), or for inability to reduce steroid* dosage to 7.5 mg prednisone or equivalent per day
- Consider starting steroids* 0.5 mg – 1 mg/kg/day prednisone or equivalent daily (IV methylprednisolone 125 mg total daily dosage)
- Consider hospital admission for IV steroids*
- If LFTs normalized and symptoms resolved, steroids* to be tapered over ≥4 weeks when function recovers
- Once patient returns to baseline or Grade 0-1, consider resuming treatment

Grade 3 (Severe)

- Steroids* to be initiated at 1-2 mg/kg/day prednisone or equivalent daily oral
- Nivolumab to be permanently discontinued for Grade 3 events. Ipilimumab to be discontinued for any Grade 3 event, or pembrolizumab for any recurrent Grade 3 event or Grade 3 event persisting ≥12 weeks
- Admission for IV steroids*: IV methylprednisolone 1-2 mg/kg/day (up to 1G) for 3 days followed by high-dose oral prednisolone 1-2 mg/kg/day or equivalent
- R/O hepatitis infection (acute infection or reactivation)
- LFTs every 1-2 days
- If LFT elevation persists for >3-5 days, worsens, or rebounds after improvement, consider other steroid-sparing agents
- Hepatology/gastroenterology consult
- Consider liver biopsy
- If LFTs stable/declining daily for 5 consecutive days: decrease LFT checks to q 3 days, then weekly
- If LFTs normalized and symptoms resolved, steroids* to be tapered over ≥4 weeks

Grade 4 (Life-Threatening)

- Immunotherapy to be permanently discontinued
- Hospital admission
- Steroids*: IV methylprednisolone 1-2 mg/kg/day (up to 1G) for 3 days followed by high-dose oral prednisolone 1-2 mg/kg/day or equivalent
- R/O hepatitis infection
- Daily LFTs
- If LFT elevation persists for >3-5 days, worsens, or rebounds after improvement, consider other steroid-sparing agents
- Hepatology/gastroenterology consult
- Consider liver biopsy
- If LFTs stable/declining daily for 5 consecutive days: decrease LFT checks to q 3 days, then weekly
- If LFTs normalized and symptoms resolved, steroids* to be tapered slowly over ≥4 weeks

Implementation:

- Check hepatitis labs in any patient with a history of hepatitis
- Institute early identification and evaluation of patient symptoms
- Institute early intervention with lab work and office visit if hepatotoxicity is suspected
- Grade LFTs and any other accompanying symptoms
- As noted in overall strategy, do not use infliximab because of hepatotoxic effects
- Assess patient & family understanding of recommendations and rationale
- Identify barriers to adherence

*Administering Corticosteroids:

Steroid taper instructions/calendar as a guide but not an absolute

- Taper should consider patient's current symptom profile
- Close follow-up in person or by phone, based on individual need & symptomatology
- Steroids cause indigestion; provide antacid therapy daily as gastric ulcer prevention while on steroids (e.g., proton pump inhibitor or H2 blocker if prednisone dosage is >20 mg/day)
- Review steroid medication side effects: mood changes (angry, reactive, hyperaware, euphoric, manic), increased appetite, interrupted sleep, oral thrush, fluid retention
- Be alert to recurring symptoms as steroids taper down & report them (taper may need to be adjusted)

Long-term high-dose steroids:

- Consider antimicrobial prophylaxis
- Consider additional antiviral and antifungal coverage
- Avoid alcohol/acetaminophen or other hepatotoxins
- If extended steroid use, risk for osteoporosis; initiate calcium and vitamin D supplements

RED FLAGS:

- **Severe abdominal pain, ascites, somnolence, jaundice, mental status changes**



ALT = alanine aminotransferase; AST = aspartate aminotransferase; GI = gastrointestinal; LFT = liver function test; po = by mouth; SGOT = serum glutamic oxaloacetic transaminase; SGPT = serum glutamic pyruvic transaminase; ULN = upper limit of normal