STANDARD TREATMENT WORKFLOW (STW)

Liver Failure

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CITATION
DOI: https://doi.org/10.56450/JEFI.2024.v2i1Suppl.0038
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STANDARD TREATMENT WORKFLOW (STW)

LIVER FAILURE

ICD-10 K72.90

ACUTE LIVER FAILURE OR ACUTE ON CHRONIC LIVER FAILURE

ACUTE LIVER FAILURE (ALF)
- Acute liver injury
- No underlying liver disease

ACUTE ON CHRONIC LIVER FAILURE (ACLF)
- Underlying liver disease
- Acute precipitating event

DIAGNOSTIC CRITERIA

- Jaundice = 4 weeks
- Encephalopathy
- Coagulopathy (INR >1.5)
- No evidence of prior chronic liver disease such as splenomegaly, ascites etc

- Jaundice (Bilirubin ≥ 5mg/dL) and coagulopathy (INR ≥ 1.5)
- Ascites/ Hepatic encephalopathy within 4 weeks of onset of jaundice; other organ failure
- Evidence of chronic liver disease

CAUSES

- Primary liver disease: Viral hepatitis, Drug induced hepatitis (e.g. AIT), Acute Fatty Liver of Pregnancy (HELLP) syndrome, Poisoning
- Systemic infection with secondary liver involvement: Malaria, leptospirosis, Typhoid, Rickettsial disease
- Suspect if:
- Fever is a predominant symptom
- Rash (Rickettsial)

- Acute precipitating event: Acute hepatitis, sepsis, GI bleeding, alcohol and drugs
- Chronic liver disease: Alcohol/ hepatitis B or C/ non-alcoholic fatty liver disease/ autoimmune liver disease/ Wilson’s disease
- Severity assessment of ACLF: Additional organ failure
Dutta U, et al.: Liver Failure

**Standard Treatment Workflow (STW)**

**LIVER FAILURE**

**ICD-10 K72.90**

### ACUTE LIVER FAILURE OR ACUTE ON CHRONIC LIVER FAILURE

**ACUTE LIVER FAILURE (ALF)**
- Acute liver injury
- No underlying liver disease

**ACUTE ON CHRONIC LIVER FAILURE (ACLF)**
- Underlying liver disease
- Acute precipitating event

### DIAGNOSTIC CRITERIA

- Jaundice (bilirubin > 3 mg/dL and coagulopathy (INR > 1.5)
- Acute/Heptatic encephalopathy within 4 weeks of onset of jaundice, other organ failure
- Evidence of chronic liver disease

### CAUSES

- Primary liver disease: Viral hepatitis, Drug induced hepatitis, (e.g. AT), Acute fatty liver of Pregnancy (AFLP), syndrome, Poisoning, Systemic infection with secondary liver involvement: Malaria, Leptospirosis, Typhoid, Riccatiasis disease
- Suspect if:
  - Fever is a predominant symptom
  - Rash (Rickettsial)
  - Renal dysfunction
  - Anemia, thrombocytopenia, subconjunctival haemorrhage

### INVESTIGATIONS

**ESSENTIAL**
- Hemoglobin, Leucocyte count (Total and Differential), Platelet count, Prothrombin time-INR
- Blood Sugar
- Liver function test: Blood Urea, Serum Creatinine, Sodium/Potassium
- Acetic acid analysis & culture
- Ultrasonography abdomen

**DESIARABLE**
- Arterial blood gas and pH
- Blood Na+, K+ levels
- U&E in ACLF

### DIAGNOSTIC INVESTIGATIONS

- Primary liver disease: Serology: HBsAg, IgG Anti HBC, IgM anti-HAV, IgM and IgG anti-HCV antibodies
- Systemic infection: Work up for Malaria/ Typhoid, Leptospirosis/Rickettsial infection in acute febrile illness

### MANAGEMENT

Urgent referral to a higher centre after initial stabilization of patient/ If no improvement/ worsening despite therapy

**PRIMARY TREATMENT/STABILIZATION:**
- IV Fluids: Normal saline/Kreger’s lactate (Add 50% dextrose if blood sugar low)
- O2 supplementation if required
- Secure airway by tracheal intubation if grade 3-4 coma
- Antibiotics/antimicrobials depending on the clinical suspicion after taking blood culture
- In: Pantoprazole 40mg IV once a day for stress ulcer prophylaxis
- IV mannitol 20%, 100ml 50% for cerebral edema, grade 3-4 coma
- Provided there is no renal failure in (ALF)
- IV Infusion N-acetyl cysteine (150mg/kg) in drug (Induced ALF) over 1 hour
- Loading 150 mg/kg over 1 hour, 30 mg/kg over 4 hours
- Maintain INR: 100 mg/kg over 16 hours every day

- If GI bleeding: Refer to STW on GI bleeding

**MANAGEMENT AT HIGHER CENTRE (In addition to primary treatment):**
- Admission in intensive care
- Supportive treatment
- Prophylactic broad spectrum antibiotics after taking blood culture
- Correct hyper-kalemia
- No role of prophylactic Fresh Frozen Plasma (FFP) for coagulopathy
- If hepatitis B: Tenofovir or Entecavir
- Acute Fatty Liver of Pregnancy (AFLP): Prompt delivery
- No investigate to diagnose acute and chronic liver injury

**TREATMENT AT HIGHER CENTRE**

**ORGAN FAILURE**

1. Hypotension:
   - Fluid resuscitation 20ml/kg over 2 hours
   - Maintenance fluid guided by hydration status and urine output
   - If no response: Vasopressors: Norepinephrine, IV infusion

2. Respiratory Failure:
   - O2 inhalation
   - Mechanical ventilation if bronchopneumonia
   - May require ventilation

3. Acute renal failure
   - Maintain fluid and electrolyte balance
   - Step diuretics, No NSAIDs
   - In ACLF: Teniposide: 1mg IV 6 hourly plus 20-40g albumin (20%) over 6-12 hours for volume expansion for suspected hepatic encephalopathy and not acute tubular necrosis
   - May require dialysis

**SEPSIS**

- Fluid resuscitation
- IV antibiotic
- For unidentified source: Broad spectrum antibiotics within an hour
- For SIRS / IV CRRT 1-2 L/kg may be tried
- To prevent hepatorenal syndrome: IV albumin 20-40g over 6-12 hours

**ENCEPHALOPATHY**

- Treat the underlying precipitating factor
- Usual care for comatosed patient
- Secure airway if grade 3-4 encephalopathy

**FOR ACLF**

- Syrup Lactulose 20 ml 6 hourly
t- Titrated dose to produce 3-4 stools/day
- Rifaximin 400mg BDS

### ABBREVIATIONS

- HDL: High density lipoprotein
- ALT: Alanine transaminase
- AST: Aspartate transaminase
- PLT: Platelet count
- INR: International normalised ratio
- IL: Interleukin
- CRP: C-reactive protein
- HBsAg: Hepatitis B surface antigen
- AT: Antithrombin
t- IgG anti-HBc: Hepatitis B core antibody
- IgM anti-HBc: Hepatitis B core antibody
- IgG anti-HAV: Hepatitis A virus antibody
- IgM anti-HAV: Hepatitis A virus antibody
- IgG anti-HCV: Hepatitis C virus antibody
- IgM anti-HCV: Hepatitis C virus antibody
- IgG anti-HIV: Hepatitis E virus antibody
- IgM anti-HIV: Hepatitis E virus antibody

This STW has been prepared by national experts of India with feasibility considerations for various levels of healthcare system in this country. These clinical guidelines are advisory, and are based on expert consensus and available scientific evidence. There may be variations in the management of an individual patient based on higher used condition, as decided by the treating physician. There will be no liability for direct or indirect consequences. Kindly visit the website of DME for more information: www.dtem.org.in for more information.

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