STANDARD TREATMENT WORKFLOW (STW)

Liver Failure

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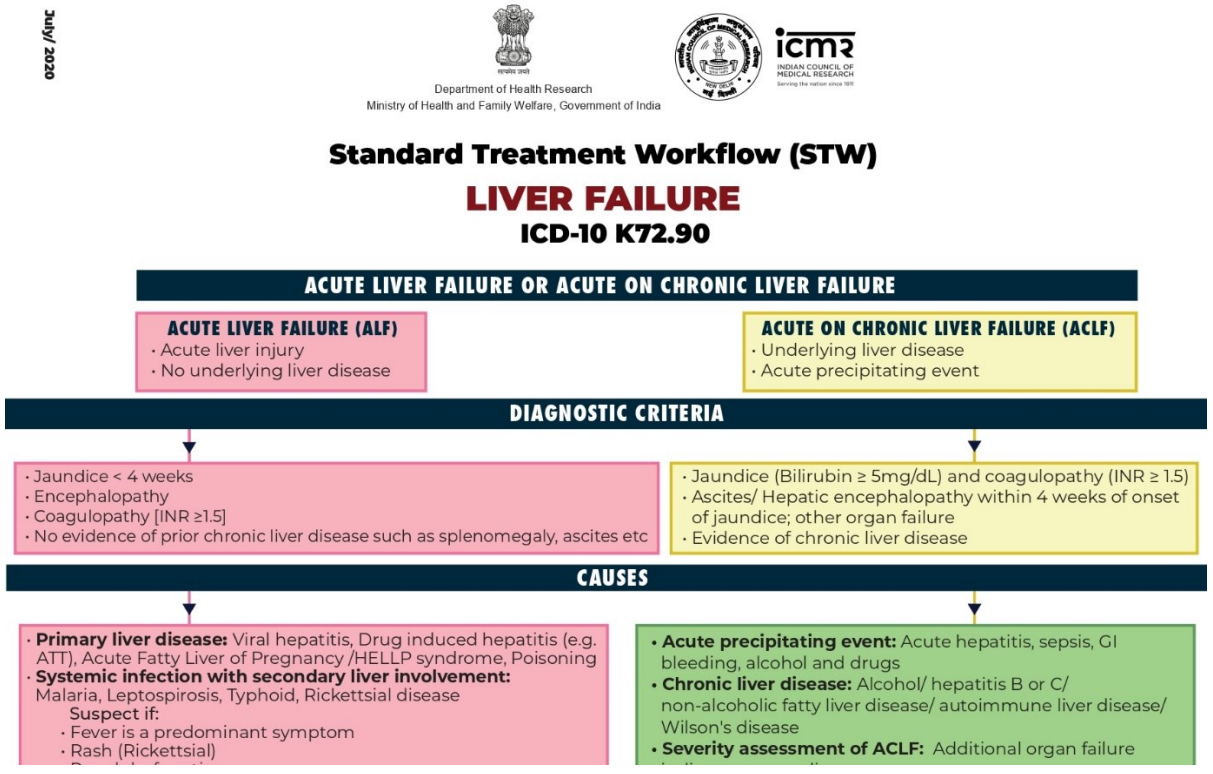

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Standard Treatment Workflow (STW)

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. ATT), 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)
  - Renal dysfunction
  - Anemia, thrombocytopenia, subconjunctival haemorrhage

- **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 indicates severe disease

INVESTIGATIONS

ESSENTIAL
- Hemoglobin, Leucocyte count (Total and Differential), Platelet count, Prothrombin time-INR
- Blood Sugar
- Liver function test, Blood Urea, Serum Creatinine, Sodium/Potassium
- Ascitic fluid analysis & culture
- Ultrasound abdomen

DESIRABLE
- Arterial blood gas and pH
- Blood NH_3 levels
- UGIE in ACLF

DIAGNOSTIC INVESTIGATIONS
- Primary liver diease- Serology: HBsAg, IgG Anti HBC, IgM anti-HAV, IgM anti HEV and anti HCV antibodies
- Systemic Infection- Work up for Malaria/ Typhoid/ Leptospira/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:
- I.V. Fluids: Normal saline/Ringer's lactate (Add 50% dextrose if blood sugar low)
- O_2 supplementation if required
- Secure airway by tracheal intubation if grade 3-4 coma
- Antibiotics/ antimalarials depending on the clinical suspicion after taking blood culture
- Inj. Pantoprazole 40mg IV once a day for stress ulcer prophylaxis
- I.V. mannitol 20%, 100ml SOS for cerebral edema/grade 3-4 coma provided there is no renal failure in (ALF)
- IV infusion N-Acetylcysteine 150mg/kg in drug (induced ALF) over 1 hour
- Loading :150 mg/kg over 1 hour, 50 mg/kg over 4 hours
- Maintainence: 100 mg/kg over 16 hours every day

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

- **If GI Bleeding: Refer to STW on GI bleeding**

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: Noradrenaline I.V. infusion
2. **Respiratory Failure**
   - O_2 inhalation
   - Nebulization if bronchoconstriction
   - May require ventilation
3. **Acute renal failure**
   - Maintain fluid and electrolyte balance
   - Stop diuretics, No NSAIDs
   - In ACLF, Terlipressin: 1mg IV 6 hourly plus 20-40g albumin (20%) over 6-12 hours for volume expansion for suspected hepatorenal syndrome and not acute tubular necrosis
   - May require dialysis

SEPSIS
- Fluid resuscitation
- I.V. antibiotics*:
  - For unidentified source : Broad spectrum antibiotics within an hour.
  - For SBP : IV Ceftriaxone 1g BD may be tried
- To prevent hepatorenal syndrome: IV Albumin 20-40g over 6-12 hours

** (The choice of antibiotics may vary depending on local sensitivity pattern and availability)*

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

FOR ACLF
- Syrup Lactulose 20-30ml 6 hourly, titrate dose to produce 3-4 stools/day
- Rifaximin 400mg TDS

ABBREVIATIONS

HELLP: Haemolysis, elevated liver enzymes, low platelet count
IgM anti-HAV: Immunoglobulin M antibody to hepatitis a virus
HBsAg: Hepatitis B virus surface antigen
IgM anti-HBc: Immunoglobulin M antibody to Hepatitis B core antigen
IgM anti- HEV: Immunoglobulin M antibody to hepatitis E virus
ATT: Anti-Tubercular treatment
INR: International normalised ratio
UGIE: Upper gastrointestinal endoscopy