Hepatitis D (HDV)

Hepatitis E (HEV)

Caused → HDV → HE virus.

Seen → Central Africa, Middle East, Central South America → Developing countries India, Asia, Africa, Central America.

Transmission → Contact ~~c~~ Infected blood, Contaminated needle, Sexual contact ~~c~~ HDV infected person. → Like HAV through Contaminated food & water.

Symptoms → Similar to HBV → Same as HAV
After infection ~~c~~ HDV virus, Hepatitis develops in about 2–8 wks. → Jaundice & flu like aches.

Virus require hepatitis B to reproduce.
Cannot infect a person who is not infected ~~c~~ HBV.
People ~~c~~ co infection of HBV & HDV have much higher risk of Hepatitis than HBV alone.
Severe liver disease develops to Cirrhosis → Infected people may be contagious for 2 wks after flu symptoms appear
1–2% has chance of developing sudden & severe liver disease where liver transplant may be needed

	HDV	HEV.
Treatment →	Same as HBV. Interferon use can be successful for some	→ No treatment for HEV Hepatitis
Vaccination →	No vaccination but Hepatitis B vaccine can prevent infection of HDV.	→ No vaccin

Hepatitis → Due to Chemicals

Amanita → Death Cap MushRoom — 10 mg Lethal Dose (found in single MushRoom)

- Carbon tetrachloride
- Acetaminophen
- Yellow phosphorus.
- Trichloroethylene Industrial toxin.

Directly toxic to liver & kill liver cells.

↓

Cause Toxic hepatitis

Acetaminophen → taken in overdose

10 gm to 15 gm or less can produce liver injury.

Ingestion of 7.5 gms or more can lead to deadly liver disease.

Other drugs causing Hepatitis

1. Halothane used as anesthetic. should not be given to Pat's ē fever or Jaundice.
2. Methyl dopa — used to treat high B.P damages liver
3. Isoniazid → used to treat Tuberculosis in 1% of Pat's ē first 2 months of treatment
4. phenytoin → anti convulsant → causes severe hepatic ↓ leads to liver failure
5. Valproic acid — another " ↓ Causes Hepatitis (common in children younger than 2 yrs).
6. Zidovudine → Antiviral
7. Ketoconazole → antifungal
8. Nifedipine → calcium channel blocker for Heart patients
9. Ibuprofen → anti inflammatories
   Indomethacin
10. Amitriptyline → antidepressants
11. Rifampicin & Nitrofurantoin ⊗ Antitubercular
    ↓ Antibiotic
12. Oral Contraceptives → Causes Jaundice ↓ implicated in development of Budd Chiari syndrome

Cirrhosis of Liver

Def: Cirrhosis is a condition in which the liver does not function properly due to long term damage

→ Damage is characterized by replacement of Normal liver tissue by scar tissue.

→ Cirrhosis is most commonly caused by alcohol, hepatitis B, hepatitis C, and Non alcoholic fatty liver disease.

Etiology: 1. Alcoholic liver disease:

- In women 2 to 3 drinks / day
- In men 4-5 drinks / day
  - → leads to liver cirrhosis.

Alcohol injure the liver by blocking the normal Metabolism of protein fat & Carbohydrates.

2. Ch. Hepatitis C: Hepatitis C virus is a Major cause of ch. liver disease & of Cirrhosis — As it causes inflammation & damage to liver.

Ch Hepatitis B & D : Hepatitis B virus like Hepatitis C - causes liver inflammation & injury lead to cirrhosis.

→ Hepatitis D another virus that infects the liver but only in people who already have hepatitis B.

~~Autoimmune Hepatitis~~ : Inherited diseases: like

1. Alpha - 1 antitrpsin deficiency
2. Hemochromatosis
3. Wilson's disease
4. Galactosemia
5. Glycogen storage diseases enterfere with liver function stores Enzymes, protein, Metals & other substances

Autoimmune Hepatitis : Immune system attacks the liver & cause inflammation

↓

Damage leads to scarring.

↓

Cirrhosis.

Pathogenesis

Alcohol Metabolized
by
Alcohol dehydrogenase
(ADH)

Acetaldehyde.

Aldehyde dehydrogenase

Acetic acid

oxidized

CO_2 & H_2O.

During this process generates NADH.
Nicotinamide adenine dinucleotide

Higher NE Concentration induces fatty acid
Synthesis

Higher levels of fatty acids

Signals to liver cells
to Compound to Glycerol

to form Triglycerides.

Accumulate → Resulting
fatty liver.

severe ...

Inflammatory cytokines → TNF-α, IL6, IL8

are thought to be essential in initiation and perpetuation of liver injury

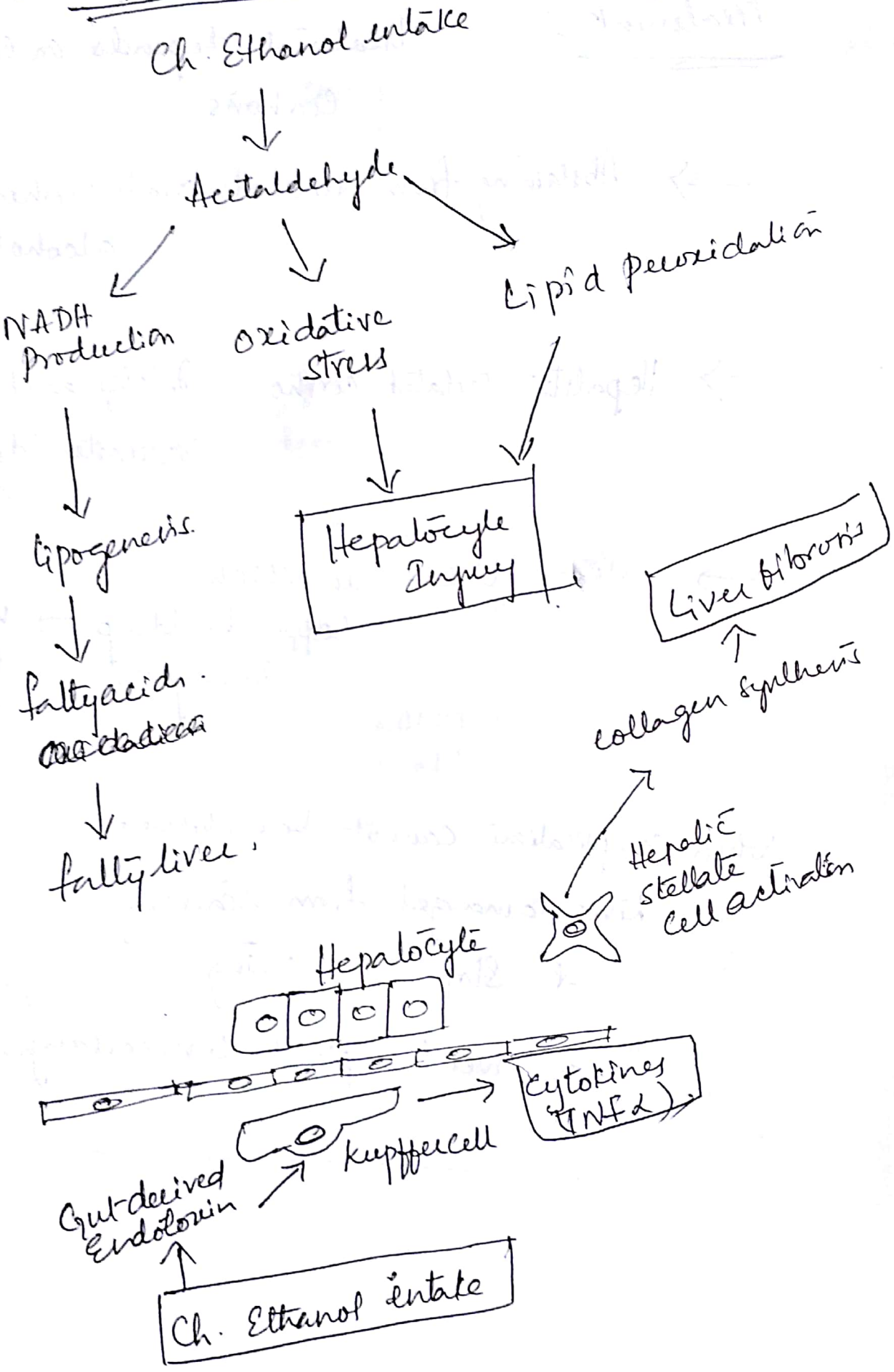
↑sed activity of TNF-α is due to ↑sed intestinal permeability due to liver disease.

→ This facilitates the absorption of gut produced Endotoxin into portal circulation

→ Kupffer cells → (Macrophages Special) of liver phagocytose Endotoxin, stimulating the release of TNFα →

TNFα triggers apoptotic pathways resulting cell death.

(16) Pathogenesis alcohol induced liver injury



Treatment: Treatment depends on cause of Cirrhosis.

→ Abstaining from alcohol treats Cirrhosis by alcohol abuse.

→ Hepatitis related cirrhosis Interferon for viral
corticosteroids for autoimmune

→ Wilson's disease in which copper buildup in organs. → with Medication to remove copper.

When complications cannot be controlled
Liver damaged from scarring
& Stops functioning
Hence Liver transplant is necessary.