NUTRITION AND LIVER DISEASE

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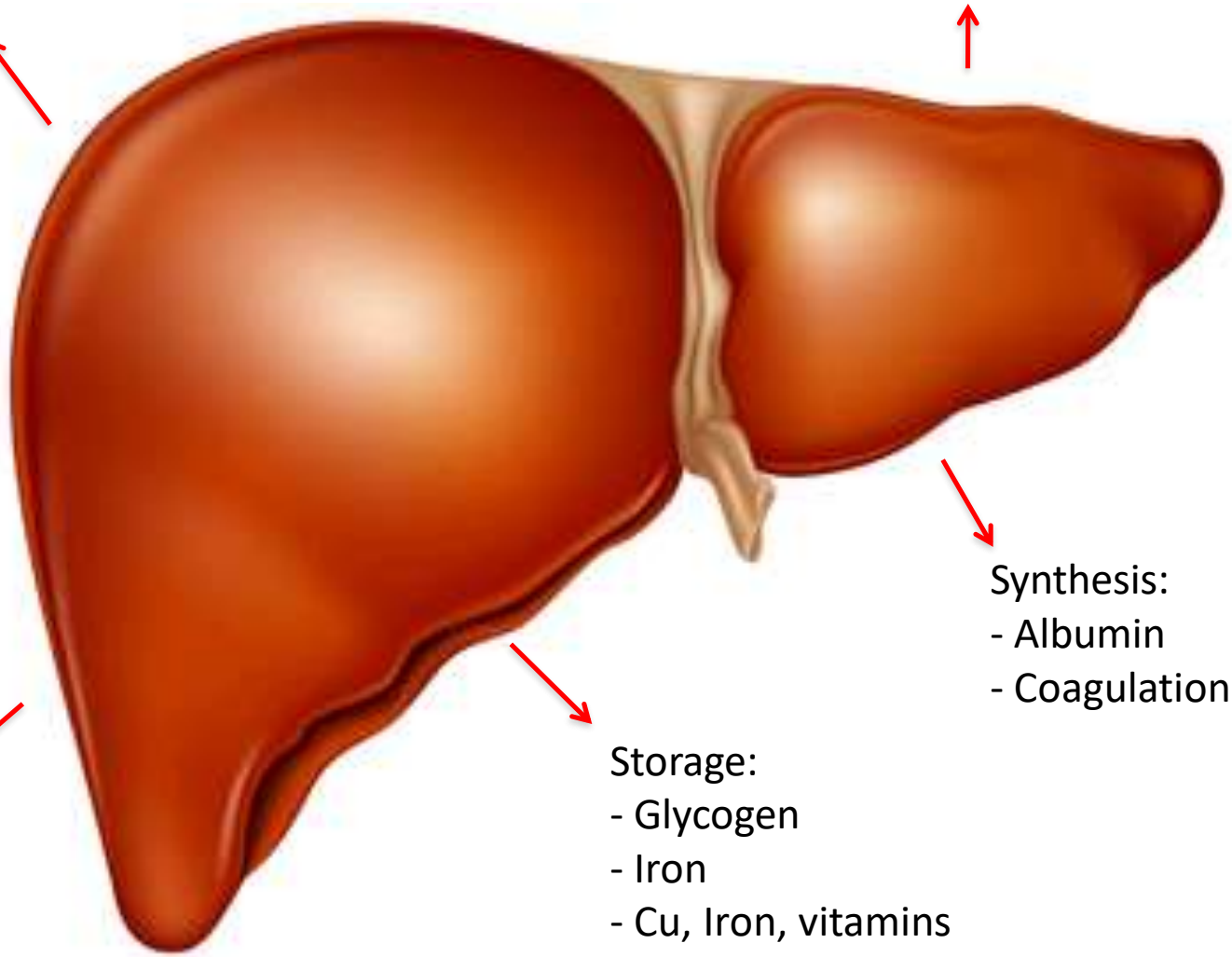
CHRONIC
DISEASE

Catabolism of hormones
and other serum proteins

Glucose homeostasis;
glycogenolysis & gluconeogenesis



Synthesis:
- Albumin
- Coagulation factors

Bile excretion

Storage:
- Glycogen
- Iron
- Cu, Iron, vitamins

KATHARINE BROWN

Nutritional Needs of Patients with Liver Disease

- "Accelerated Starvation": It would take a healthy adult 72 hours of starvation to reach same level of fat & muscle breakdown as occurs in overnight fast for cirrhotic patient (due to low liver & glycogen stores)

What Does the Liver Do?

Nutrition Related Functions

- Manufacturing Plant
- Storage Facility
- Waste Disposal

Manufacturing Functions

- **Protein**- for the bloodstream (albumin)
- **Glycogen**- storage form of glucose for energy
- **Bile**- to help digest fats that are needed for cell structure and energy)
- **Cholesterol** – and special proteins to carry fat through the blood

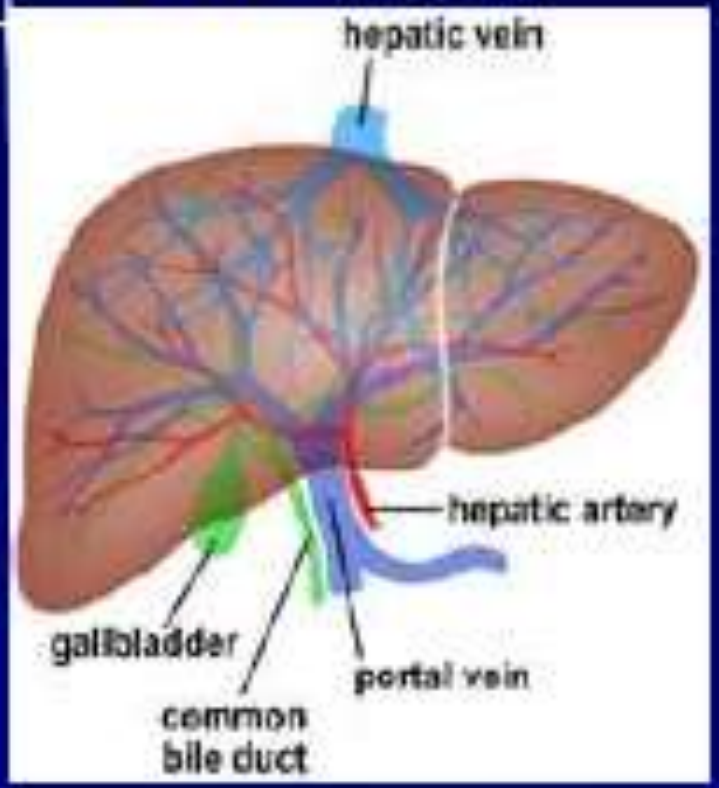
Storage Facility

- **Glycogen**-released when our bodies need energy (this includes during sleep for basic metabolism)
- **Iron**- most is stored in the liver

Waste Disposal

- **Ammonia** - from the breakdown of dietary protein and muscle tissue
- **Bilirubin** - from the breakdown of red blood cells
- **Bacteria** – removed from the bloodstream
- **Drugs and Alcohol** - are metabolized in the liver

How Diet Can Help with Symptoms



Fluid Gain: Ascites, Edema

1. *Low Sodium Diet: decreases water/ fluid retention*
2. *Adequate protein: keeps fluid in the arteries and veins rather than leaking into tissues*
3. *Avoid Excessive Fluid Intake*

FUNCTIONS OF THE LIVER

- **Major role of the liver is the regulation of solutes in the blood that affect the functions of other organs for example: the brain, heart, muscle and kidneys**

- **Strategically placed such that all blood passing from the small intestine must travel through the liver**

ROLE OF THE LIVER IN NUTRIENT METABOLISM

Carbohydrate

- Storage of carbohydrate as glycogen
- Gluconeogenesis
- Glycogenolysis

ROLE OF THE LIVER IN NUTRIENT METABOLISM

Protein

- Synthesis of serum proteins e.g. albumin
- Synthesis of blood clotting factors
- Formation of urea from ammonia
- Oxidation of amino acids
- Deamination or transamination of amino acids

ROLE OF THE LIVER IN NUTRIENT METABOLISM

Fat

- Hydrolysis of triglycerides, cholesterol and phospholipids to fatty acids and glycerol
- Formation of lipoproteins
- Ketogenesis
- Fat storage
- Cholesterol synthesis
- Production of bile necessary for digestion of dietary fat

ROLE OF THE LIVER IN NUTRIENT METABOLISM

Vitamins

- Site of the enzymatic steps in the activation of vitamins : thiamine
  pyridoxine
  folic acid
  vitamin D(25 hydroxycholecalciferol)
- Site of the synthesis of carrier proteins for vitamins: A,B12, E
- **Storage site for fat soluble vitamins A, D, E, K, B12**

Minerals

- **Storage site for copper, iron and zinc**

FUNCTIONS OF THE LIVER

- **Storage and metabolism of macronutrients such as protein, carbohydrates and lipids**
- **Metabolism of micronutrients – vitamins and minerals**
- **Metabolism and excretion of drugs and toxins – endogenous and exogenous**

METABOLISME CARBOHYDRATE

- During periods of fasting or exercise the liver can release glycogen to muscles for energy
- Although the liver can store considerable amounts of glycogen, it is the first energy source used during periods of prolonged fasting or caloric deprivation, and it can be depleted rapidly.
- After glycogen, the body taps other energy sources → including protein and fat.

PROTEIN METABOLISM:

- We take in dietary protein from dairy products, produce, and meats.
- Enzymes produced by the pancreas and intestine break down the protein into its amino acids and small peptides.
- The intestine rapidly absorbs the amino acids with specific transport systems within its lining cells and then delivers the amino acids to the liver via the portal vein.
- When they reach the liver, they are used for energy or synthesized new proteins.
- The newly synthesized proteins perform specific body functions.

FAT METABOLISM:

In general, fats are neutral lipids (triglycerides), acidic lipids (fatty acids), and sterols (cholesterol, plant sterols).

Triglycerides (dairy products, meats, oils, butter, margarine) are the most common type of dietary fat and represent a major source of energy.

The liver is uniquely suited to regulate and process triglycerides.

FAT METABOLISM CONT'D.....

- Dietary triglyceride is digested in the intestine by lipase an enzyme secreted by the pancreas in response to meals.
- Bile secreted by the liver, makes the digested fat soluble and promotes its absorption.
- Absorbed fat is then repackaged and transported into blood, where the liver ultimately removes it from the circulation.

FAT METABOLISM CONT'D.....

- **Fat that reaches the liver is processed in three ways: (1) stored as fat droplets in liver cells, (2) metabolized as a source of energy, and (3) repackaged, secreted back into blood, and delivered to other cells in the body.**
- **The liver is also intimately involved with the processing of dietary cholesterol and is the main source of newly synthesized cholesterol in the body.**
- **Liver disease may be associated with both high or low blood cholesterol levels.**
- **In general, as liver disease progresses in patients with hepatitis C, the blood level of cholesterol drops.**

BILE

- The liver produces and secretes a fluid (bile) that enters the intestine to aid in digestion and absorption.
- Bile is clear yellow to golden-brown and contains water, electrolytes (salts), cholesterol, bile salts (detergents), phospholipids, and proteins.
- Bile helps to activate enzymes secreted by the pancreas and is essential for the digestion and absorption of fat or fat-soluble vitamins.

VITAMINS:

- **The liver plays a role in several steps of vitamin metabolism... Vitamins are either fat-soluble (Vitamins A, D, E, and K) or water-soluble (Vitamin C and the B-complex vitamins).**
- **Patients with advanced liver disease may become deficient in water-soluble vitamins, but this is usually due to inadequate nutrition and poor food intake. Vitamin B12 storage usually far exceeds the body's requirements; deficiencies rarely occur due to liver disease or liver failure.**
- **When dietary intake drops, however, thiamine and folate commonly become deficient. Oral supplementation is usually need to restore thiamine and folate stores to the normal range.**

VITAMINS.....

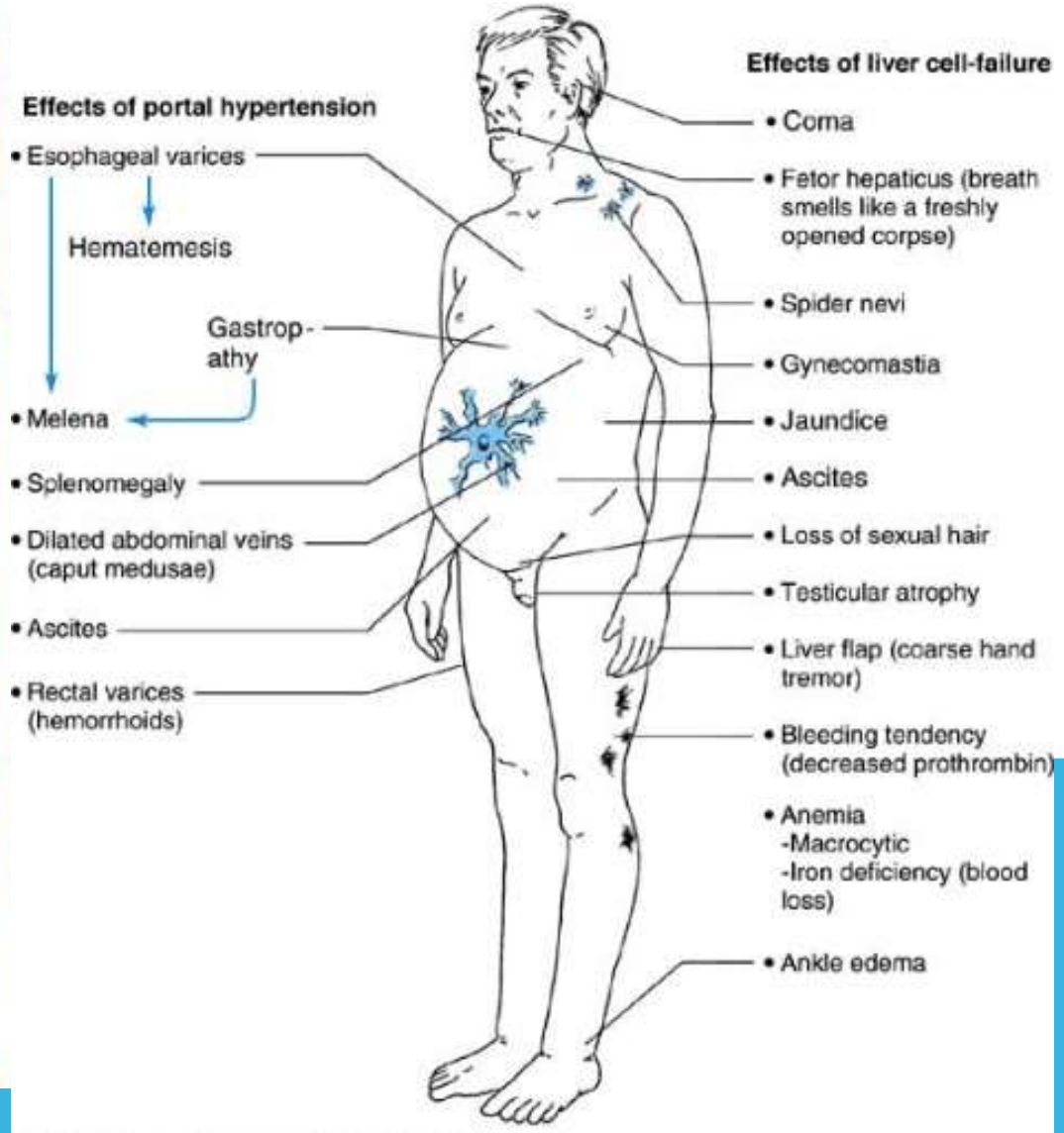
Fat-soluble vitamins require not only adequate dietary intake but also good digestion and absorption by the body.

Bile in the gut is required for the absorption of fat-soluble vitamins into the body because these vitamins are relatively insoluble in water.

Bile acts as a detergent, breaking down and dissolving these vitamins so they may be properly absorbed.

Poor production of bile: oral supplementation of vitamins A, D, E, and K may not be sufficient to restore vitamin levels to normal. The use of a detergent-like solution of liquid vitamin E (TPGS) improves the absorption of vitamin E in patients with advanced liver disease. The same solution may also improve the absorption of vitamins A, D, and K if the latter are taken simultaneously with the liquid vitamin E.

Signs of CLD


Effects of portal hypertension
• Esophageal varices
Hematemesis
Gastrop-athy
• Melena
• Splenomegaly
• Dilated abdominal veins (caput medusae)
• Ascites
• Rectal varices (hemorrhoids)
Effects of liver cell-failure
• Coma
• Fetor hepaticus (breath smells like a freshly opened corpse)
• Spider nevi
• Gynecomastia
• Jaundice
• Ascites
• Loss of sexual hair
• Testicular atrophy
• Liver flap (coarse hand tremor)
• Bleeding tendency (decreased prothrombin)
• Anemia
-Macrocytic
-Iron deficiency (blood loss)
• Ankle edema

NUTRITION FOR PEOPLE WITH CIRRHOSIS

- **At this stage the diet is generally *high in complex carbohydrates* (breads, cereals, grains, legumes, dried beans and peas, pasta, rice). These foods are important because they provide our bodies fuel source called blood glucose (also referred to as "blood sugar").**
- **During cirrhosis, individuals frequently experience *low blood sugar* (hypoglycemia) or high blood sugar (hyperglycemia).**
- **Body is better able to maintain a healthy, sustained level of energy from *complex carbohydrates* ("starches") rather than from simple carbohydrates ("sugars").**

- **Sugars found in candy, fruits, sweet pastries, and milk products →body uses it quickly.**
- **The result is that energy level usually rises and then falls too quickly with sugars than it would with complex carbohydrates, especially those with higher fiber content.**
- **Simple sugar foods only in smaller proportion to complex carbohydrates and in more controlled portions.**

PROTEIN DIET.....

Protein is needed for repair and maintenance of blood and body tissues, including liver tissue.

Persons with cirrhosis tend to better tolerate the protein from dairy and plant sources than from meat sources, and therefore may benefit from a more vegetarian type diet.

Daily protein needs in grams will vary according to nutritional state and the status of disease.

Persons with cirrhosis often begin to experience difficulty digesting and absorbing fat in the diet.

The result is *steatorrhea,* and thereby may require dietary fat modification.

Fatty liver is also a condition that can occur which is the accumulation of fat in the liver.

In either of these cases, reducing the fat to 25% of total calories (about 40-70 grams of fat daily) is recommended.

LIPID DIET.....

Use of a special prescription type of fat called MCT oil is sometimes necessary.

MCT (medium-chain triglycerides) does not require bile for absorption into the blood stream, so is advantageous when the liver can no longer produce adequate bile for digestion and absorption of dietary fat (lipid).

MCT can be used in place of other fats in cooking and some recipes and is also available in certain types of liquid nutritional drinks.

- Vitamin deficiencies can occur during this stage of the disease.
- Fat-soluble vitamins A, D, E, and K may need to be taken in their water-soluble form
- Deficiencies of the minerals zinc, calcium, and magnesium can also occur during cirrhosis and may require supplementation.
- Sodium typically needs to be restricted with cirrhosis.
- Considering that the person with cirrhosis must usually limit sodium to 2,500 milligrams per day,
- sodium acts like a "sponge" in the body and can cause to more fluid, predisposing abdominal fluid retention seen in cirrhosis called ascites.

PROTEIN AND HEPATITIS C

- **Proteins are the major building blocks that the body uses to make body components such as muscles, hair, nails, skin, and blood. Proteins also make up important parts of the immune system called antibodies, which help fight off disease.**
- **Someone with liver damage such an approach to nutrition can actually be downright dangerous. The trouble is that a damaged liver cannot process as much healthy liver.**
- **when a damaged liver gets unduly overloaded with protein, *encephalopathy* (a state of mental confusion that can lead to coma) may occur**
- **Diets high in protein have been demonstrated to enhance the activity of the cytochrome P450 enzyme system, which is responsible for drug metabolism. This enhanced activity increases the likelihood that a drug may be converted into a toxic byproduct capable of causing liver injury.**

- Protein intake must be adjusted in accordance with a person's body weight and the degree of liver damage present.
- Approximately 0.8 grams of protein per kilogram (2.2 pounds) of body weight is recommended in the diet each day for someone with stable liver disease.
- People with unstable liver disease or decompensated cirrhosis need to lower the percentage of protein content in their diets so that it falls between approximately 10 to 15 %.
- Eat only vegetable sources of protein.
- A diet high in animal protein (which typically contains a lot of ammonia) may precipitate an episode of encephalopathy among these people. Vegetarian diets, on the other hand, have a low ammonia content and have been shown to be much less likely than animal protein diets to induce encephalopathy.

- Alcoholic liver disease is the most common type of CLD
- Treatment of ALD is mostly supportive with treatment of the complications; optimising nutrition and fluid balance
- In Wilson's disease copper accumulates in the liver and CNS
- In HH iron accumulates in the liver, skin, joints, pituitary, adrenals, pancreas, heart etc.
- Liver transplant is usually the only cure in chronic liver disease

DIET YANG TIDAK DIANJURKAN PADA PENDERITA HCV

1. **Alkohol → risiko cirrhosis meningkat**
2. **garam (berlebih) : pada penyakit hati lanjut : 500-1000 mg/ hari**

   ***Avoid* : junk food, fast food, cracker etc**
3. **kadar Fe tinggi → free radical → liver damage**

SYARAT-SYARAT DIIT PADA PENYAKIT HATI:

1. Tinggi kalori, tinggi hidrat arang, lemak sedang,
   protein disesuaikan dengan tingkat keadaan klinik penderita.
   Diit diberikan secara berangsur,
   disesuaikan dengan nafsu makan penderita dan
   toleransi penderita terhadap protein.
2. Cukup mineral dan vitamin
3. Rendah garam/ cairan dibatasi bila ada ascites.
4. mudah dicerna dan tidak merangsang
5. bahan makanan yang menimbulkan gas dihindarkan

MACAM DIIT DAN INDIKASI PEMBERIAN

Diit Hati I:

- Penderita cirrhosis hepatis berat, dan penderita hepatitis infeksiosa akut dalam keadaan prekoma atau segera sesudah penderita dapat makan kembali
- Berupa cairan yang mengandung KH sederhana : sari buah, sirop, teh manis.
- Bila tak disertai ascites cairan diberikan kurang lebih 2 liter/ hari, bila ada ascites dan diuresis belum sempurna : cairan maksimum 1 liter/ hari.
- Rendah kalori, protein, kalsium, besi, thiamin
- Sebaiknya tidak diberikan lebih dari 3 hari
  Untuk menambah kalori bisa diberikan infus glukosa

BAHAN MAKANAN YANG DIBERIKAN

Sari buah	1000 g	5 gls
Sirop	400 g	2 gls
Gula pasir	100 g	10 sdm

Nilai gizi:

Kalori	1025		besi	9,3 mg
Protein	7	g	vit. A	2775 SI
Lemak	1	g	thiamin	0,6 mg
KH	247	g	vit.C	635 mg
Kalsium	0,2	g	natrium	31,4 mg

PEMBAGIAN MAKAN SEHARI

Pukul 07.00	teh manis	1 gls
Pukul 08.00	sari pepaya	1 gls
Pukul 10.00	air jeruk	1 gls
Pukul 12.00	sari pepaya	1 gls
	sirop	1 gls
Pukul 15.00	air jeruk	1 gls
Pukul 18.00	sari pepaya	1 gls
	sirop	1 gls
Pukul 20.00	teh manis	1 gls

DIIT HATI II

- **Bila keadaan akut/ prekoma sudah diatasi**
- **Penderita sudah mempunyai nafsu makan**
- **Diberikan dalam bentuk cincang/ lunak**
- **Protein dibatasi 30 g/ hari**
- **Lemak yang mudah dicerna**
- **Rendah kalori, kalsium, besi dan thiamin sebaiknya diberikan beberapa hari saja.**
- **Bila ada ascites hebat, diuresis belum baik : diberikan diit rendah garam I**

BAHAN MAKANAN YANG DIBERIKAN

• Beras	120 g	4 gls bubur nasi
• Maezena	20 g	4 sdm
• Daging	50 g	1 ptg sedang
• Telor	25 g	½ butir
• Sayuran	200 g	2 gls
• Buah	300 g	3 ptg pepaya sedang
• Gula pasir	100 g	10 sdm
• Margarin	25 g	2 ½ sdm

Nilai gizi :

Kalori	1475		besi	9,3 mg	
Protein	27	g	vit.A	8892 SI	
Lemak	30	g	thiamin	0,5 mg	
KH		278 g	vit.C		170 mg
Kalsium	0,2	g	natrium	360 mg	

DIIT HATI III

- **Sebagai makanan perpindahan dari diit hati II**
- **Penderita dengan nafsu makan cukup**
- **Diberikan dalam bentuk lunak/ biasa**
- **Protein diberikan 1 g/ kgBB/hari**
- **Lemak sedang dalam bentuk yang mudah dicerna**
- **Cukup kalori, besi, vitamin A dan vitamin C, kurang kalsium dan thiamin**
- **Bila ada retensi cairan/ ascites berikan rendah garam**
- **Bila ascites hebat/ diuresis belum baik berikan RG I**

BAHAN MAKANAN YANG DIBERIKAN

	berat (g)	urt	
• Beras	250	5 gls tim	
• Maezena		20	4 sdm
• Daging		100	2 pt sdg
• Telur	25	½ butir	
• Tempe		50	2 pt sdg
• Sayuran		200	2 gls
• Buah		300	3 pt pepaya sdg
• Minyak		25	2 ½ sdm
• Gula pasir		60	6 sdm

Nilai gizi :

• Kalori	2013		besi	16,6 mg	
• Protein		54	g	vit.A	8432 SI
• Lemak		46	g	thiamin	0,8 mg
• KH		349	g	vit.C	170 mg
• Kalsium		0,3	g	natrium	233 mg

DIIT HATI IV

- **Makanan perpindahan dari diit hati III**
- **Pada penderita hepatitis infeksiosa dan cirrhosis hepatis yang nafsu makannya baik, dapat menerima protein, tidak menunjukkan gejala cirrhosis hepatis aktif.**
- **Bentuk lunak/ biasa**
- **Mengandung kalori tinggi, protein tinggi,lemak cukup,KH tinggi, vitamin dan mineral cukup.**
- **Bila ada retensi air berikan rendah garam (diit hati IV rendah garam).**
- **Bila ascites hebat dan tanda-tanda diuresis belum baik berikan RG I.**

MAKANAN YANG DIBERIKAN

	berat (g)	urt
Beras	350	5 gls nasi
Daging	100	2 pt sdg
Telur	100	2 butir
Tempe	100	4 pt sdg
Kacang hijau	25	2 ½ sdm
Sayuran	200	2 gls
Buah	200	2 pt pepaya sdg
Minyak	25	2 ½ sdm
Gula pasir	40	4 sdm
Susu	200	1gls

Nilai gizi :

Kalori		2554		besi		28,0 mg
Protein	91	g	vit.A		9176 SI	
Lemak		64	g	thiamin		1,3 mg
KH	404	g	vit.C		133 mg	
Kalsium	0,7	g	natrium		414 mg	

BAHAN MAKANAN YANG TIDAK BOLEH DIBERIKAN

Sumber lemak : semua makanan dan daging yang banyak mengandung lemak: seperti daging kambing, babi.

Bahan makanan yang menimbulkan gas : ubi, kacang merah, kol, sawi, lobak, ketimun, durian, nangka.

Cara memesan diit : diit hati I/II/III/IV Rendah garam I/II/III (DH I/II/III/IV RG I/II/III)

PENYAKIT KANDUNG EMPEDU

Kolesistitis peradangan kandung empedu disebabkan oleh penyumbatan saluran empedu oleh batu empedu

Gejala: nyeri pada seperempat bagian atas perut, mual, muntah, kembung, ikterus

Pengobatan: analgetik, antiemetik, kolesistektomi dan drainase duktus biliari

Penatalaksanan gizi

1. Intervensi: kurangi rangsangan kandung empedu (rendah lemak atau tidak sama sekali), suplementasi (vitamin A dan E larut dalam air
2. Pendidikan pasien: pembatasan diet dan rasionalisasi

SYARAT-SYARAT DIET PADA PENYAKIT KANDUNG EMPEDU.....

1. Rendah lemak untuk mengurangi kontraksi kandung empedu, diberikan dalam bentuk mudah dicerna.
2. Kalori, protein, KH : cukup, bila terlalu gemuk jumlah kalori dikurangi.
3. tinggi vitamin terutama yang larut dalam lemak.
4. mineral cukup
5. cairan banyak untuk membantu pengeluaran kuman-kuman atau sisa-sisa metabolisme dan mencegah dehidrasi.
6. tidak merangsang dan diberikan dengan porsi kecil tetapi sering untuk mengurangi rasa kembung

MACAM DIIT DAN INDIKASI PEMBERIAN

DIIT RENDAH LEMAK I

1. Untuk penderita cholecystitis akut dan cholelithiasis dengan kolik akut.
2. Diberikan berupa buah-buahan dan minuman manis
3. Rendah kalori dan semua zat-zat kecuali vitamin A dan C
4. Sebaiknya diberikan selama 2-3 hari

BAHAN MAKANAN YANG DIBERIKAN SEHARI

	berat (g)	urt
• Buah	1000	10 pt pepaya sedang
• Sirop	400	2 gls
• Gula pasir	100	10 sdm

Nilai gizi :

• Kalori	996		besi	17 mg
• Protein	5	g	vit.A	3650 SI
• Lemak	0	g	thiamin	0,4 mg
• KH	244	g	vit.C	780 mg
• Kalsium	0,2	g		

PEMBERIAN MAKAN SEHARI

Pukul 07.00	teh manis	1 gls
Pukul 08.00	pisang	1 gls
Pukul 10.00	pepaya	2 ptg sdg
Pukul 12.00	pisang	2 bh sdg
	sirop	1 gls
Pukul 15.00	pepaya	2 ptg sdg
Pukul 18.00	pisang	2 bh sdg
	sirop	1 gls
Pukul 20.00	pisang	1 ptg sdg
	teh manis	1 gls

BAHAN YANG DIBERIKAN SEHARI

	berat (g)	urt
• Beras	100	3 gls bubur nasi
• Daging	100	2 pt sdg
• Telur	50	1 butir
• Tempe	100	4 pt sdg
• Sayuran	200	2 gls
• Buah	400	4 pt pepaya sdg
• Margarin	10	1 sdm
• Gula pasir	30	3 sdm

Nilai gizi :

• Kalori	1338		besi	21,8 mg
• Protein	57	g	vit.A	9138 SI
• Lemak	33	g	thiamin	0,8 mg
• KH	211	g	vit.C	211 mg
• Kalsium	0,4	g		

DIIT RENDAH LEMAK III

Untuk penderita penyakit kandung empedu yang tidak gemuk dan cukup mempunyai nafsu makan.

Dalam bentuk lunak/ biasa

Cukup kalori dan semua zat gizi

BAHAN MAKANAN YANG DIBERIKAN SEHARI

Beras	250	5 gls nasi tim
Maezena	20	4 sdm
Daging	100	2 pt sdg
Telur	50	1 butir
Tempe	100	4 pt sdg
Sayuran	250	21/2 gls
Buah	200	2 pt pepaya sdg
Margarin	10	1 sdm
Gula pasir	80	8 sdm
Susu skim	20	4 sdm

Nilai gizi :

Kalori	2073		besi	21,8 mg
Protein	74	g	vit.A	10473 SI
Lemak	34	g	thiamin	0,9 mg
KH	369	g	vit.C	143 mg
Kalsium	0,7	g		

BAHAN MAKANAN YANG TIDAK BOLEH DIBERIKAN

Sumber lemak : semua makanan yang digoreng

semua makanan/daging yang mengandung lemak tinggi : mayonais, daging kambing, dan babi.

Bahan makanan yang menimbulkan gas : ubi, kacang merah, kol, sawi, lobak, durian, nangka, mentimun.

Bumbu yang merangsang : cabe, bawang,merica, asam, cuka, jahe.

Minuman yang mengandung soda dan alkohol.

PENATALAKSANAAN PANKREATITIS

- **Pengobatan: antikolinergik seperti atropin, anti nyeri**
- **Penatalaksanaan gizi:**
  1. Penilaian gangguan
  2. Intervensi:
- **Hindari perangsangan sekresi pankreas dan penyebab nyeri selama pankreatitis akut (TPN). Nyeri berkurang beri cairan, rendah lemak, tinggi karbohidrat, diet bertahap.**
- **Rangsang penyembuhan dan modifikasi diet untuk kompensasi penurunan sekresi pankreatik pada pankreatitik akut. Tinggi protein, tinggi karbohidrat, lemak sesuai toleransi. Minyak MCT Medium Chain Triglyceride), enzim pankreas, sekresi insulin terganggu**
- **Pendidikan pasien (pembatasan diet dan rasionalisasi),**
- **Hindari minuman beralkohol**

HEPATITIS

Hepatitis adalah radang hati

Penyebab: virus, toxin, obstruksi, parasit, obat-obat (alkohol, kloroform, karbon tetraklorida)

Lab: peningkatan kadar bilirubin serum, aspartat aminotransferase (AST0, atau SGOT), alanin aminotransferase (ALT, atau SGPT), dan laktat dehidrogenase (LDH)

Pengobatan: penyebab dihilangkan, istirahat dan terapi gizi pengobatan utama

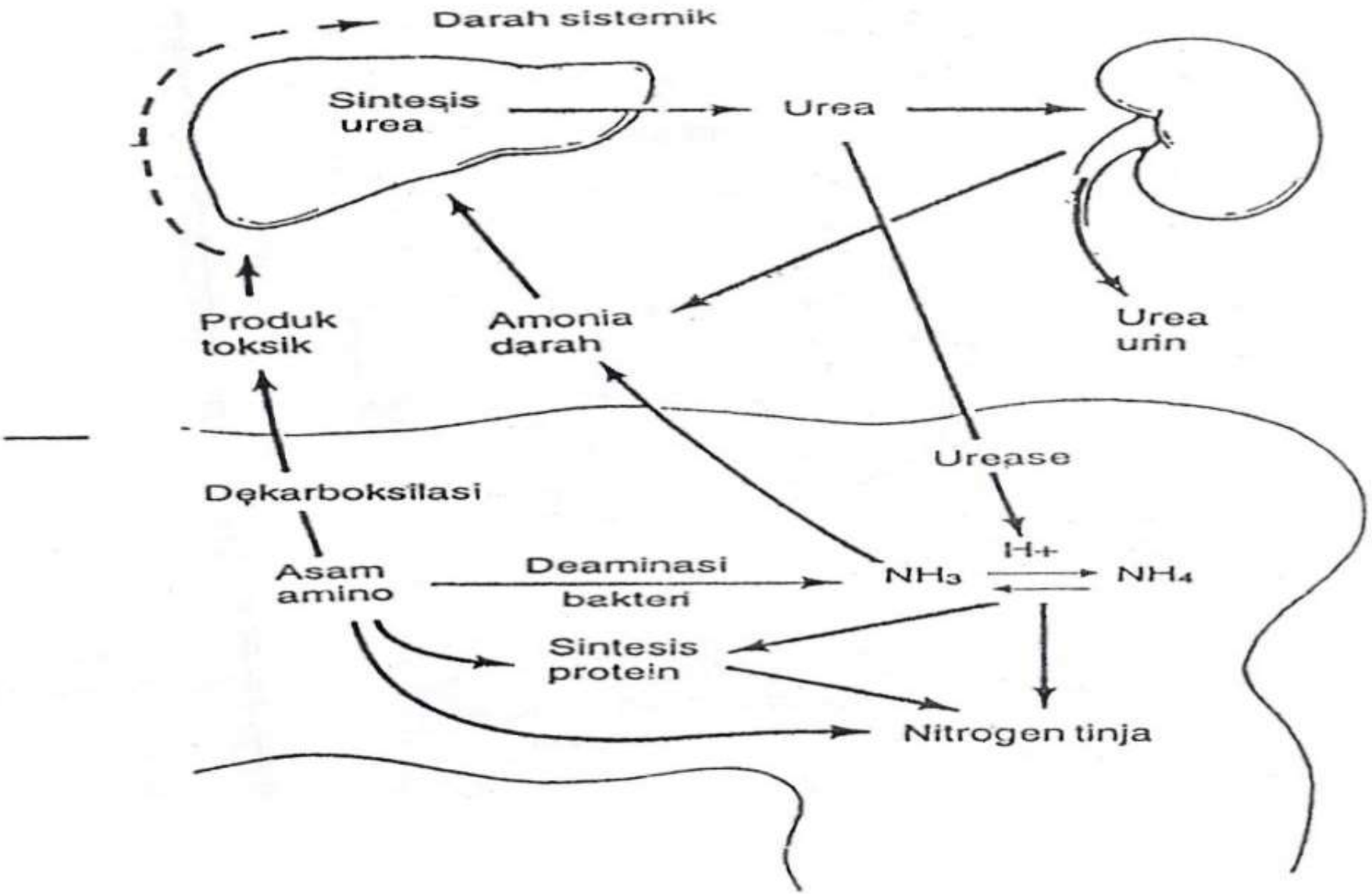
PENATALAKSANAAN GIZI PADA HEPATITIS

- **Penilaian gangguan**
- **Intervensi:**
  1. Promosi regenerasi hati: tinggi kalori, tinggi protein, sedang lemak, karbohidrat sumber kalori utama, makanan sering tapi porsi kecil
  2. Suplementasi: bila stetorea diberi suplemen vitamin A, E dalam bentuk larut dalam air
- **Pendidikan pasien**
  1. Modifikasi diet dan rasionalisasinya: tinggi protein, rendah lemak
  2. Hindari alkohol

PENATALAKSANAAN SIROSIS DAN ENSEFALOPATI HEPATIK

- **Pengobatan: laktulosa menurunkan amonia**
- **Penatalaksanaan gizi:**
  1. Penilaian gangguan
  2. Intervensi:
- **Hindari perangsangan atau perlakuan yang memperhebat ensepalopati, sementara menyediakan diet paling bergizi (tinggi kalori 45-50kkal/kg, lemak moderat 70-100g kecuali steatorea, MCT , protein dibatasi 1-1,5 g/kg, pada ensepalopati dibatasi 0,5 g/kg maksimum 1 g/kg, protein nabati lebih ditoleransi, Asam Amino Rantai Cabang (BCAA), Natrium dibatasi**
- **Dorong kenyamanan dan toleransi pemberian makanan (porsi kecil tapi sering)**
- **Cegah perdarahan varises esofagus (makanan lembut rendah serat)**
- **Suplemen 2-3 kali RDA vitamin B kompleks**

METABOLISME AMONIA



ACUTE HEPATITIS:

High protein/high energy intake required to promote hepatocyte regeneration

- Fat restriction contraindicated
- Nausea/anorexia
- Consider oral supplementation such as glucose polymers, fruit based high protein drinks, or high protein/ high energy drinks in the presence of nausea/anorexia

Caution against herbal remedies as some may be harmful and most have no scientific basis

NUTRITIONAL MANAGEMENT OF END STAGE LIVER DISEASE

Energy Requirements:

- Patients with **compensated** cirrhosis do not appear to need modification of their energy intakes
- Patients with **decompensated** liver disease require 35 – 40 non protein kcals/kg/day*
- Ascites is a viable metabolic unit

*Plauth M, Merlim, Kondrup J, Weimann A, Ferenci P, Muller MJ.*ESPEN Guidelines for Nutrition in Liver Disease and Transplantation.* Clinical Nutrition 1997; 16: 43-55

NUTRITIONAL MANAGEMENT OF END STAGE LIVER DISEASE

Protein

- **Protein turnover in cirrhotic patients is normal or increased**
- **Stable cirrhotics have increased protein requirements[1,2]**
- **Stable cirrhotic patients are capable of achieving positive nitrogen balance during aggressive nutritional support regime[1,2]**

[1]Kondrup J, Neilsen K et al. *Effect of long term refeeding on protein metabolism in patients with cirrhosis of the liver.* Br J Nutr 1997; 77: 197-212

[2]Swart, GR et all. *Minimal protein requirements in liver cirrhosis determined by nitrogen balance measurements at three levels of protein intake.* Clin Nutr 1989; 8: 329-336

- Alcoholic liver disease is the most common type of CLD
- Treatment of ALD is mostly supportive with treatment of the complications; optimising nutrition and fluid balance is key.
- There are three autoimmune forms of CLD
- In Wilson's disease copper accumulates in the liver and CNS
- In HH iron accumulates in the liver, skin, joints, pituitary, adrenals, pancreas, heart etc.
- Liver transplant is usually the only cure in chronic liver disease

Diet penyakit hati diberikan kepada pasien dengan penyakit hati seperti Hepatitis dan Sirosis Hati.

Tujuan Diet:

1. Mencegah kerusakan jaringan hati lebih lanjut
2. Memperbaiki jaringan hati yang rusak
3. Mengurangi beban kerja hati
4. Memperbaiki/ mempertahankan status gizi pasien
5. Menghindari kompilasi penyakit hati

Syarat Diet :

1. Energi : 40—45 kkal/kg BB per hari
2. Lemak : 20— 25% dari kebutuhan energi total
3. Protein : 0,5 — 1,25 g/kg BB/hari, pemberian protein sesuai kondisi hati
4. Bila ada Anemia diberikan suplementasi vitamin B kompleks, C, E, Zinc, asam folat
5. Pemberian garam dibatasi apabila ada edema dan asites
   - oedema : bengkak pada bagian tubuh terutama kaki dan tangan
   - Asoites : bengkak pada bagian perut, karena cairan tertimbun di bawah kulit perut
6. Bentuk makanan disesuaikan dengan kemampuan saluran cerna

Hal-hal yang perlu diperhatikan:

- Masaklah dengan cara merebus, mengukus, memanggang, mengungkep, pepes
- Hindarkan makanan yang digoreng
- Dianjurkan menumis dengan menggunakan minyak kedele atau minyak jagung
- Sayuran dimasak sampai matang
- Memasak sayuran jangan menggunakan santan kental

Pengaturan Makanan

BAHAN MAKANAN	DIANJURKAN	DIBATASI	DIHINDARI
SUMBER KARBOHIDRAT 	nasi, kentang, roti, mie, makaroni, bihun, gula, tepung-tepungan yang dibuat bubur atau puding		ketan, ubi, singkong, talas, kue gunih dan cake
SUMBER PROTEIN HEWANI  	Susu skim	Daging tidak berlemak, ikan, ayam, hati yang dipanggang, diungkep, disemur, ditim, telur direbus/ didadar	daging berlemak, daging asap, sosis, sarden, daging/ ikan yang diawetkan. Susu full cream, susu kental manis dan hasil olahnya keju, es krim
SUMBER PROTEIN NABATI		Kacang-kacangan	
SAYURAN 			Sayuran yang berserat dan menimbulkan gas seperti: kol, sawi, lobak, daun singkong, nangka muda, kemberg kol.
BUAH-BUAHAN 			Buah-buahan yang tinggi serat, tinggi lemak, dapat menimbulkan gas seperti: nangka, nanas, durian, kedondong
MINUMAN	Kopi encer		Minuman yang mengandung soda dan alkohol seperti: arak, bir, soft drink
LAIN-LAIN		Garam dapur, margarine, mentega, minyak goreng, santan encer	Goreng-gorengan, santan kental, kelapa, tape Bumbu: cabe, cuka, lada, kecap asin, saos tomat

Contoh Menu

Pagi	Siang	Malam
Nasi tim Telur dadar Asem-asem buncis Teh manis	Nasi tim Semur ayam Tahu bumbu kuning Cah wortel dan jagung muda Pepaya	Nasi tim Perkedel daging bakar Tempe bacem Sup sayuran Pisang
Selingan Selada buah dan sirup	Selingan Puding susu dan sari buah jeruk	Selingan Roti bakar dan teh manis

TERIMA KASIH