

MNT Of CKD &Gout

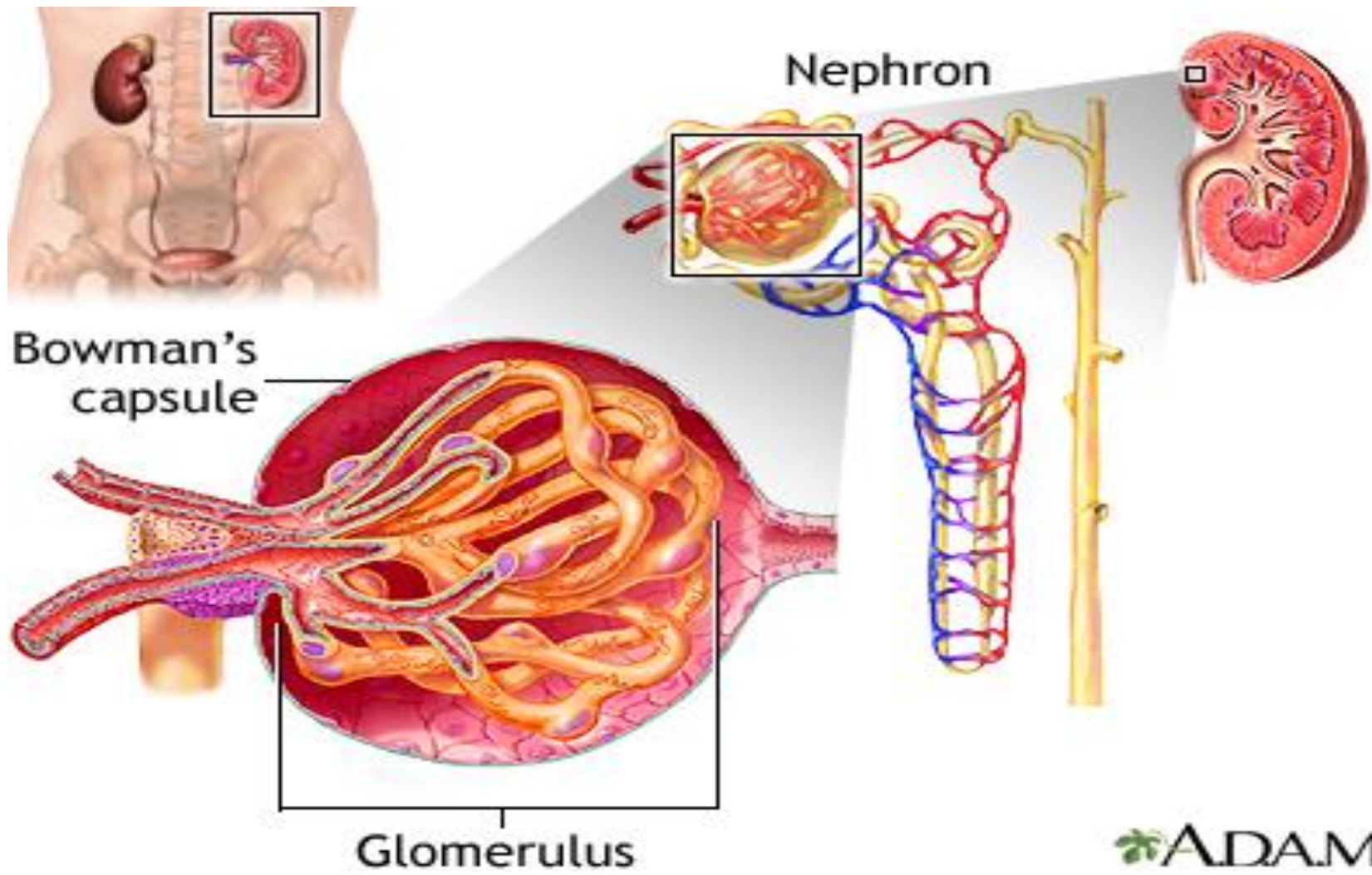
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Kidneys

- Excrete wastes
- Maintain volume and composition of body fluids
- Synthesize and secrete certain hormones as needed
- Filter blood and remove or recycle waste products

Kidneys

- Maintain fluid, acid-base, and electrolyte balance
- Nephrons
 - Working parts
- Glomerulus
 - Filtering unit



Kidneys

- Ureters transport liquid waste materials from kidneys to bladder
 - Waste materials:
 - End products of protein metabolism, excess water and nutrients, dead renal cells, and toxic substances

Kidneys

- Oliguria:
 - Urinary output less than 500 mL per day
 - Kidneys unable to adequately eliminate waste products
 - Can result in renal failure

Etiology of CKD

- Diabetes mellitus (DM) 40%
- Hypertension 30%
- Glomerulonephritis 15%
- Hereditary cystic renal disease 4%
- Interstitial nephritis/pyelonephritis 4%
- Tumours 2%
- Miscellaneous 5%

Renal Diseases

- Acute renal failure
 - Occurs suddenly
 - May last a few days to a few weeks
 - Can be caused by another medical problem
 - E.g., serious burn, crushing injury, cardiac arrest
- Chronic kidney disease
 - Develops slowly with number of functioning nephrons diminishing

- CKD (CRF) means : chronic progressive irreversible loss of renal function. It is defined as the presence of clinical and/or pathologic evidence of kidney disease for at least 3 months.
- ESRD: advanced CKD (Stage-5) requiring dialysis or kidney transplantation

Chronic Kidney Disease - Stages

Stage	Description	GFR (ml/min/1.73m ²)
1	Kidney damage with normal or ↑ GFR	➤90
2	Mild ↓ GFR	60 – 89
3	Moderate ↓ GFR	30 - 59
4	Severe ↓ GFR	15 – 29
5	Kidney failure, ESRD	<15 or dialysis



GFR FORMULA

- $\text{GFR}[\text{mL}/\text{min}] = (140 - \text{Age} [\text{years}]) \times \text{weight} [\text{kg}] / (72 \times \text{serum creatinine} [\text{mg}/\text{dL}]) \times 0.85 \text{ if female}$

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- **Chronic kidney failure, also known as chronic renal failure, chronic renal disease, or chronic kidney disease** , is a slow progressive loss of kidney function over a period of several years. Eventually the patient has permanent kidney failure.
 - **Chronic kidney failure is much more common than people realize** , and often goes undetected and undiagnosed until the disease is well advanced and kidney failure is fairly imminent. It is not unusual for people to realize they have chronic kidney failure only when their kidney function is down to 25% of normal.
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RENAL FAILURE

Multi-Systemic Effects of End-stage Renal Disease

Neurologic

- Coma
- Headache
- Inattentiveness
- Lethargy
- Seizures

Skeletal

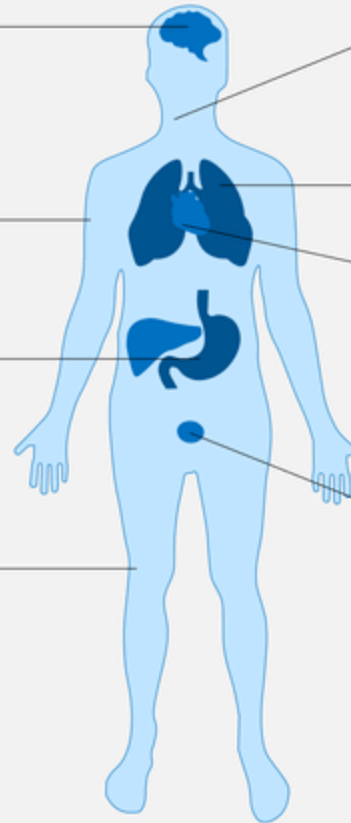
- Hyperphosphatemia
- Hypocalcemia
- Weak, brittle bones

GI

- Anorexia
- Decreased appetite
- Gastric hypomotility
- Glucose intolerance
- Hyperphosphatemia

Dermatologic

- Dry skin
- Poor healing
- Pruritus



Hematologic

- Bleeding
- Immunosuppression
- Platelet dysfunction

Respiratory

- Pleural effusions

Cardiovascular

- Arrhythmias
- Edema
- Heart failure
- Hypertension
- Pericarditis
- Pericardial

Genitourinary

- Amenorrhea
- Hematuria
- Proteinuria

End-stage (ESRD) renal disease affects multiple organ systems, causing numerous health problems and frequent hospitalization

Renal Diseases

- Chronic kidney disease
 - Uremia
 - Condition in which protein wastes not excreted
 - Instead, circulated in blood
 - Symptoms:
 - Nausea, headache, coma, and convulsions
 - Severe renal failure can result in death unless dialysis used

Renal Diseases

- Nephrosclerosis
 - Hardening of renal arteries
 - Caused by arteriosclerosis and hypertension
 - Usually occurs in older clients
 - Sometimes develops in younger clients with diabetes

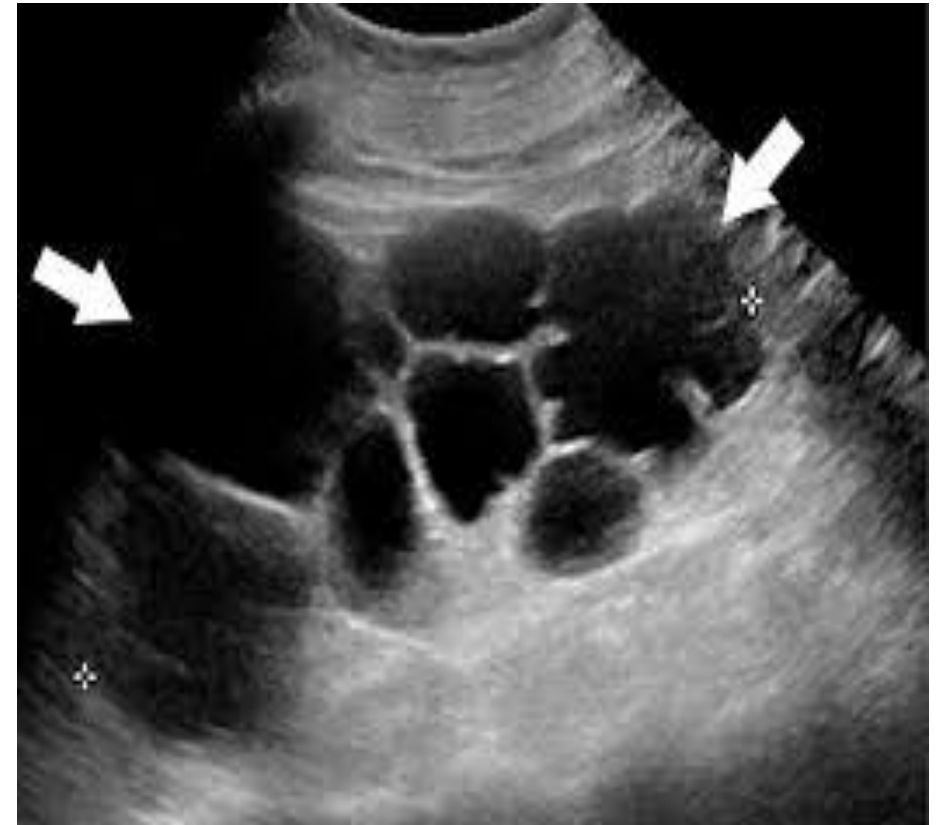
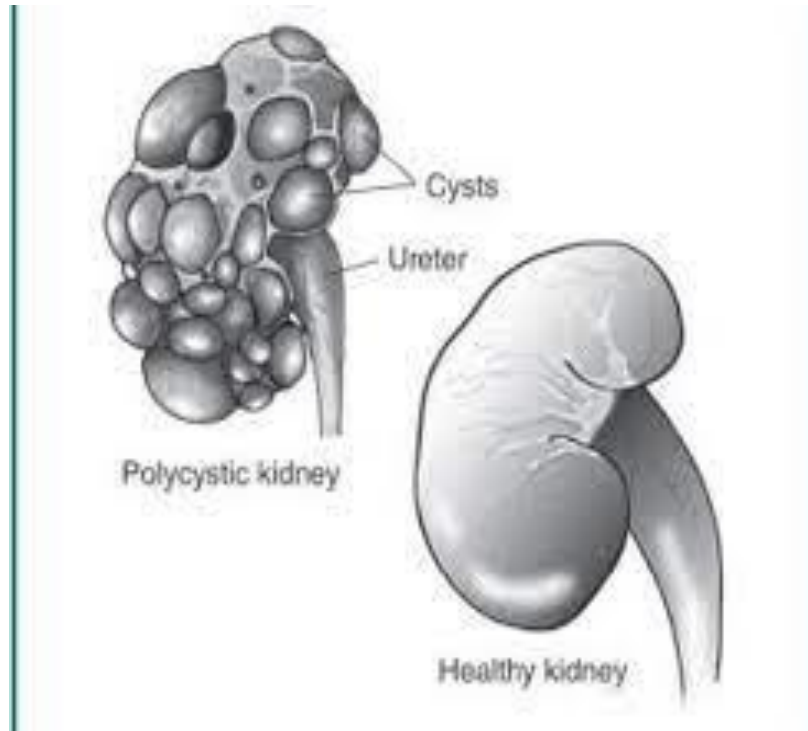
Renal Diseases

- Nephritis
 - Inflammatory disease of kidneys
 - Caused by infection, degenerative processes, or vascular disease
- Glomerulonephritis
 - Inflammation affecting capillaries in glomeruli

Renal Diseases

- Polycystic kidney disease
 - Relatively rare hereditary disease
 - Cysts form
 - Press on kidneys
 - Kidneys enlarge
 - Lose function
 - Renal failure may develop

POLYCYSTIC KIDNEYS





Renal Diseases

- Nephrolithiasis
 - Stones develop in kidneys
 - Classified according to composition
 - Associated with metabolic disturbances and immobilization of client

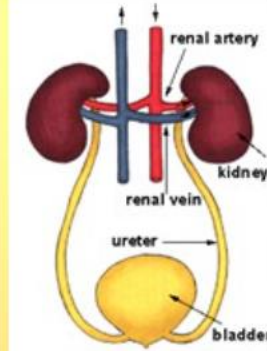
FAT<30
%

MNT goal :

- ✓ Control hypertension
- ✓ Minimize edema
- ✓ Decr. urinary alb. losses
- ✓ Prevent protein malnutrition & muscle catabolism
- ✓ Supply adequate energy
- ✓ Slow the progress of renal disease.

MNT:

- Adequate **protein** *0.8-1gm/kg/d* to avoid catabolism.
- **Energy** $\geq 35\text{Kcal/kg/d}$, to avoid malnutrition.
- **CHO** *50-60%* of total caloric intake..



Nutrients to Monitor

Protein (80 grams is a common daily limit for people on hemodialysis.)

Phosphorus (Normal levels for serum phosphorus are 1.8-2.6 mEq/L)

Sodium (Normal levels for serum sodium are 135-145 mEq/L)

Potassium (Normal levels for serum potassium are 3.5-5 mEq/L)

Fluid

Dietary Treatment of Renal Disease

- Energy requirements should be fulfilled by carbohydrates and fat to spare protein
- Metabolized protein increases amount of nitrogen waste kidneys must handle
- Protein allowance based on glomerular filtration rate and weight

Vegetables, grains, meats, fish, poultry, and legumes (beans and peas) have protein. Most of the protein you eat should come from meats, fish, poultry (chicken) and legumes (beans and peas).

1 ounce cooked meat, fish, poultry	= 7 g
1 large egg	= 7 g
1/2 cup cooked dried beans , peas, lentils	= 8 g
1/2 cup tofu	= 7 g
2 tablespoons peanut butter	= 7 g
1 cup milk , soy milk, or yogurt	= 8 g
1/2 cup pudding or custard	= 4 g
1 slice or 1 inch cubed cheese	= 7 g
1/2 cup cottage cheese or ricotta cheese	= 7 g
2 tablespoons Parmesan cheese	= 7 g

Dietary Treatment of Renal Disease

- Sodium and fluids may be limited to prevent edema, hypertension, and CHF
- Calcium and vitamin D supplements may be prescribed
- Phosphorus may be limited if retained

Sodium

Sodium makes us thirsty and want to drink more. As we drink more fluids, we retain fluid and our **blood pressure** goes up which puts a strain on our kidneys and heart.

Avoiding foods high in salt and sodium helps control fluid. You may eat 2000 mg (2 grams) of sodium per day.

1 TEASPOON OF SALT EQUALS 2 G OF SODIUM WHICH IS EQUAL TO YOUR SODIUM ALLOWANCE FOR THE DAY.

High Sodium Foods

Limit sodium to 2000 mg each day



Processed meats



Meat product (ham, bacon, sausage)



Salty **snacks** (chips, pretzels, nuts)



Pickled foods



Butter, garlic salt, seasoned salt



Barbecue **sauce** , soy sauce, ketchup, mustard



Processed cheeses

Dietary Treatment of Renal Disease

- Hyperkalemia may occur in end-stage renal disease (ESRD)
 - Potassium may be restricted
- Renal clients often have increased need for vitamin B, vitamin C, and vitamin D
 - Supplements often given

Potassium

Potassium helps muscles including the heart muscles to contract and relax. Too much potassium in your blood can cause hyperkalemia and emergency treatment should be started. Unless your doctor tells you otherwise, limit potassium to 2000 mg each day.

Apricots	Honeydew Melon	Yogurt	Tofu
Avocado	Milk	Prunes	Tomato Juice
Banana	Molasses	Pumpkins	Salmon
Bran Cereal	Potatoes / Sweet Potatoes	Raisins	Tomatoes
Buttermilk	Figs	Salt Substitutes	Vegetable Juice
Chard	Oranges	Spinach	Watermelon
Dried Beans/Peas	Papaya	Sunflower Seeds	Winter Squash

Phosphorus

Most foods have phosphorus in them. Too much phosphorus can cause calcium to come out of bones, making bones brittle and easier to fracture or break. Most people with kidney failure should limit phosphorus to 800-900 mg a day.

Baking powder	Cheese (except cottage cheese)	Dried peas	Organ meats (brain and liver)
Beer	Chocolate	Eggs	Nuts, peanuts, and peanut butter
Gran cereals	Dark cola beverages	Fish	Poultry
Dreads raised with baking powder Caramel	Dried beans	Milk and milk products	Whole grains, whole wheat bread

Dietary Treatment of Renal Disease

- Iron commonly prescribed to treat or prevent anemia

Dialysis

- Hemodialysis
 - Requires permanent access to bloodstream through fistula
 - Treat three times per week for three to five hours each time
- Peritoneal dialysis
 - Uses peritoneal cavity for access
 - Less efficient than hemodialysis
 - Usually treat three times per week for approximately 10 to 12 hours per day



Dialysis

- Continuous ambulatory peritoneal dialysis (CAPD):
 - Exchanges fluid four to five times daily
 - Complications:
 - Peritonitis, hypotension, and weight gain

Diet during Dialysis

- Must carefully control protein intake
 - 75 percent should be high biological value
- Potassium usually restricted
- Typical renal diet could be written as “80-3-3”
 - 80 g protein, 3 g sodium, and 3 g potassium daily



Diet after Kidney Transplant

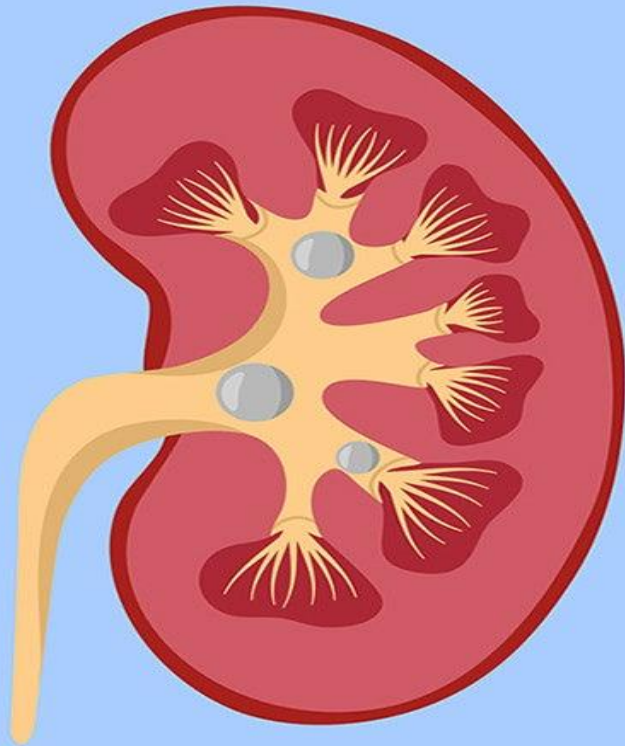
- Need for extra protein or for restriction of protein
- Carbohydrates and sodium may be restricted
- Additional calcium and phosphorus may be necessary if substantial bone loss before transplant

Kidney stones

- also called renal calculi, nephrolithiasis or urolithiasis).
- are hard deposits made of minerals and salts that form inside kidneys.
- Diet, excess body weight, some medical conditions, and certain supplements and medications are among the many causes of kidney stones

RENAL STONES

SYMPTOMS OF A KIDNEY STONE



STOMACH PAIN



BACKACHE



VOMITING



DIZZINESS



FEVER



BLOOD IN
THE URINE



Abd Renal
C5-1
19Hz
RS
2D
62%
Dyn R 55
P Low
HPen

TIS0.3 MI 1.1



Dietary Treatment of Renal Stones

- Varies based on type of stone
- Drink large amount of fluid
- Eat well-balanced diet
- Once stones analyzed, specific diet modifications may be indicated

Calcium Oxalate Stones

- Risk factors:
 - Excessive animal protein intake
 - Oxalate
- Reduce level of oxalate
 - Found in beets, wheat bran, chocolate, tea, strawberries, and spinach



ACCOUNTS FOR 80%



Uric Acid Stones

- Restrict purine-rich foods
 - Found in meats, fish, poultry, organ meats, anchovies, sardines, meat extracts, and broths
- Usually associated with gout, gastrointestinal diseases that cause diarrhea, and malignant disease

ACCOUNT FOR 9%

Cystine Stones

- Caused by excessive cystine concentration in urine
 - Due to hereditary metabolic disorder
- Increased fluids and alkaline-ash diet recommended

**ACCOUNT FOR
1%**



Struvite Stones

- Composed of magnesium ammonium phosphate
- Develop following urinary tract infections caused by certain microorganisms
- Low-phosphorus diet often prescribed



Struvite stones(STAGHORN)

- REPEATED UTI of urease-producing bacteria including Proteus, Staphylococcus, Pseudomonas, Providencia, and Klebsiella.
- However, these stones only account for approximately 10% of all staghorn calculi

Gout

Hereditary abnormal metabolism of purines, cause a form of acute arthritis, with inflamed joints (usually knees& feet).

Hyperuricemia results with deposition of urate& s.t. sodium.

MNT goals:

- Weight loss for obese patient.
- Increase urates excretion.
- Force fluid intake to prevent uric acid stones.
- Correct any existing hyperlipidemia.



Photo: U.S. Centers for Disease Control and Prevention



High level of uric acid concentration in the blood-----Hyperuricemia

Normal Uric acid levels are 2.4-6.0 mg/dL (female) and 3.4-7.0 mg/dL (male).

**Blood uric acid level rises above 7 mg/dL.--
--Gout**

Uric acid deposition called tophi (Tophus)

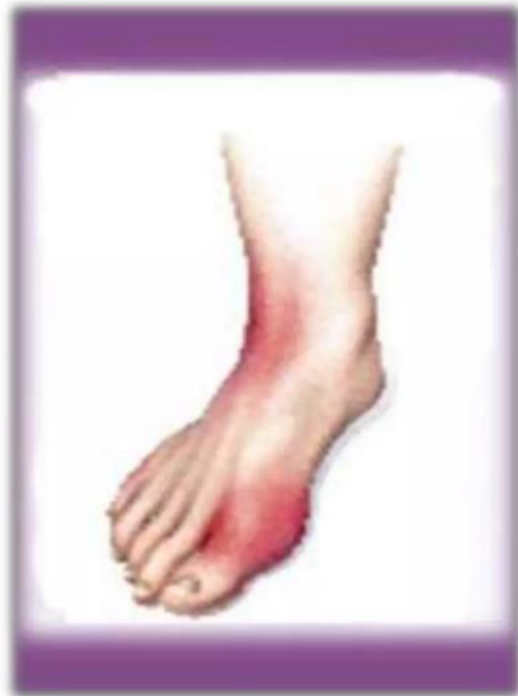
Tophi



Predisposing Factors

- Gender- male > female
- Family History
- Previous attack
- Body size - large > small
- Alcohol
- Diet – purine rich
- Diuretics
- Causes of high cell turnover e.g. psoriasis, chemotherapy
- Renal insufficiency

The Four Stages of Gout



- Asymptomatic
- Acute
- Intercritical
- Chronic

Asymptomatic

- No symptoms
- Only by physical examination/
diagnostic studies
- **Uric acid Level: 7-8 mg/dl**



Acute stage



- Severe and sudden onset
- Only one or two joints will be involved
- Symptoms will appear usually at the night time
- Joints will be warm, red, oedematous, pain and tender
- **increase in uric acid level (8-12mg/dl)**

Intermediate stage



- Symptoms will worsen over an extended time
- Joints will be warm, red, oedematous, pain and tender
- Severe Pain
- Increased accumulation of uric acid crystals
- **Uric acid level : 12-15mg/dl**

Chronic stage



- Continuous and persistent pain
 - Decrease in the mobility of joints
 - Increase in redness and edema
 - Difficulty to treat with medicine
 - **Uric acid level: >15 mg/dl**
-

Dietary recommendations (MNT):

1-High CHO diet& low fat intake increase excretion of urates.

2- In acute case; avoid excessive intake of purines(shellfish, smoked meat, sardines & meat extracts).

3-Exclude alcohol beverages.

4-Calorie controlled diet for obese.

5-Ensure high fluid intake.



Foods high in purines

- **High: content 150-825mg/100g**

*Shellfish, seafood, sardines.

*Meat, brain, kidney, liver.

- **Moderate: content 50-150mg/g**

*Vegetables; cauliflower, green peas, mushrooms, spinach

*Grains & legumes; peas, lentils, beans,

*Oatmeal, wheat bran, whole grain breads & cereals.

*Fish; all kind, lobsters, oysters.



*Meat; beef, lamb

*Poultry; chicken, duck, turkey.



• **Low: content 0-50mg/100g**

*Beverages; carbonated beverages, coffee, tea.

*Grains; bread& cereals (refined white flour)

*Dairy; cheese, milk (all fat levels)

*Miscellaneous; eggs, fat, fruits& juices,
gelatin, nuts, sugars& sweets,
vegetables.

