F16-072

SGD-1

A male of 26 years came with anorexia and fatigue with reduced urine output and increased level of urea (240mg/dL), blood urea nitrogen (BUN) and serum creatinine 3.6mg/dL

1. What is azotemia and uremia?
2. What are causes of azotemia and uremia?
3. Give the normal values of BUN and creatinine
4. What are the causes of anuria and oliguria?
5. What are the sign and symptoms of renal failure?
6. What are the lab tests for diagnosis of this patient?

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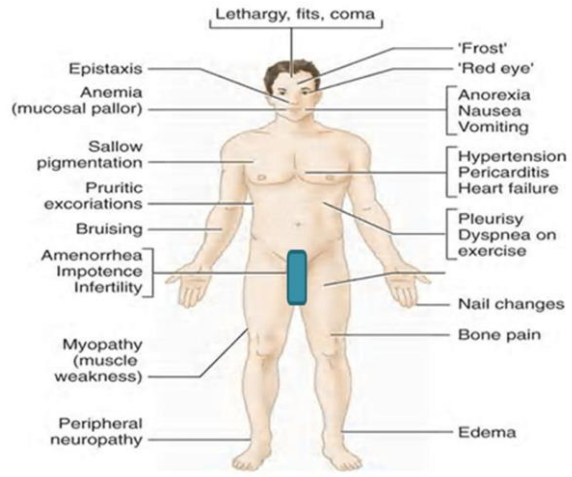
Key:

- **Azotemia:** an abnormal increase in concentration of urea and other nitrogenous substances in the blood plasma
- **Uremia:** the complex of symptoms due to severe persisting renal failure that can be relieved by improving clearance
- **Oliguria:** UOP <~400 ml/24hrs
- **Anuria:** UOP < ~200 ml/24hrs

Signs & symptoms of uremia



Prerenal Azotemia	Renal Azotemia (Intrinsic)	Postrenal (Obstructive)
Acute hemorrhage	Acute glomerulonephritis	Upper urinary tract obstruction (ureteral)
Gastrointestinal fluid loss	Interstitial nephritis (drugs, sepsis)	Lower urinary tract obstruction (bladder outlet)
Trauma and Surgery	Acute tubular necrosis	
Burns	Ischemia	
Low output syndrome	Nephrotoxic drugs (antibiotics)	
Renal artery stenosis	Solvents (carbon tetrachloride, ethylene glycol)	
Relative decrease	Radiographic contrast dyes	
Sepsis	Myoglobinuria	
Hepatic failure		
Allergic reaction		

Signs and Symptoms of Kidney failure

- ❑ Vomiting
- ❑ Loss of appetite
- ❑ Fatigue and weakness
- ❑ Sleep problems
- ❑ Changes in urine output
- ❑ Decreased mental sharpness
- ❑ Muscle twitches and cramps
- ❑ Hiccups
- ❑ Swelling of the feet and ankles
- ❑ Persistent itching
- ❑ Chest pain, if fluid accumulates around the lining of the heart
- ❑ Shortness of breath, if fluid accumulates in the lungs
- ❑ High blood pressure (hypertension) that's difficult to control

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Signs + Symptoms

- Nausea
- Vomiting
- Loss of appetite and weight loss
- Fatigue and weakness
- Insomnia
- Changes in urine output (polyuria → oliguria)
- Decreased mental sharpness
- Muscle twitches and cramps
- Hiccups
- Peripheral oedema
- Persistent itching
- Chest pain
- Shortness of breath
- High blood pressure
- Increased blood urea nitrogen (BUN) and creatinine
- Mild anaemia
- GFR progressively decreases from 90 to 30 ml/min
- Erectile dysfunction (in men)

TABLE 1

CAUSES OF ANURIA AND OLIGURIA

I. Anuria

A. Retention (full bladder)
- Posterior urethral valve
- Urethral atresia
- Other obstruction distal to bladder neck

B. Primary anuria
- Bilateral renal agenesis or aplasia
- Bilateral severe multicystic disease

II. Oliguria (15-20 mL/kg./day)

A. Retention
- Same as IA

B. Decreased urine formation
- Sepsis
- Shock
- Hypotension
- Renal vein or artery thrombosis
- Cortical or tubular necrosis

Blood Urea Nitrogen	A waste product formed after your body uses the protein it needs.	Normal: 7-20 mg/dL.
Serum Creatinine	A waste product in the blood created by the metabolism of muscle cells.	Normal: 1.2 mg/dL for women; 1.4 mg/dL for men.
Creatinine Clearance	A measure of how much of the waste product creatinine is in your urine.	Normal: Greater than 90 ml/min.
Glomerular Filtration Rate (GFR)	A measure of how well the kidneys are processing wastes.	Normal: 90 ml/min. Less than 15 indicates kidney failure.
Microalbumin Urine Test	A measure of microscopic amounts of protein in the urine may be an early sign of kidney disease.	Normal: Less than 30 mg/L • 30 mg/L - 300 mg/L is called microalbuminuria. • Greater than 300 mg/L is called macroalbuminuria.
Urine Protein Test	A measure of protein in the urine.	Normal: Negative.

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SGD-2

A 60 years male diabetic and hypertensive presented with oliguria.

On investigation is GFR is less than 25%. Other investigations are following

Urea= 50mg/dL, k+= 4mg/dL, Ca++= 6mg/dL,

He is also having iron deficiency anemia.

1. What is the diagnosis?
2. What are the manifestations of chronic kidney disease?
3. What is the cause of metabolic acidosis in chronic kidney disease?

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SGD NEPHRO 1:

A 68 Y/O MAN COMES TO OPD COMPLAINING OF FATIGUE AND LOW URINE OUTPUT SINCE A FEW DAYS. HE IS DIABETIC SINCE 25 YRS AND IS HYPERTENSIVE AS WELL SINCE 10 YRS. HE IS NON COMPLIANT WITH MEDICATIONS AND HAS NOT SEEN A PHYSICIAN IN 5 YRS. HE ALSO COMPLAINS OF BONE PAINS, ANOREXIA, AND NAUSEA O/E HE HAS CONJUNCTIVAL PALLOR AND MULTIPLE ECCHYMOSES ON SKIN.

LABS: HB: 9.7 G/DL BUN: 140 CR: 7.2 CA: 6.6 MG/DL PHOSPHATE : LOW

A) WHAT IS YOUR DIAGNOSIS?
B) WHAT ARE THE EXTRA RENAL MANIFESTATIONS OF CRF:
C) ENUMERATE RFTs. WHAT ARE THE NORMAL VALUES?
D) CLASSIFY AZOTEMIA BASED ON ETIOLOGY.
E) DEFINE THE FOLLOWING:
    1. ESRD
    2. AKI
    3. CKD

KEY:

A) CHRONIC RENAL FAILURE/ CHRONIC KIDNEY DISEASE
B) UREMIC PERICARDITIS, UREMIA INDUCED PLATELET DYSFUNCTION, UREMIC ENCEPHALOPATHY, TABLE 20-1 IN BIG ROBBINS
C) SERUM CREATININE : 0.6 – 1.2 MG/DL BLOOD UREA NITROGEN (BUN): 7-18 MG/DL
D) PRERENAL: HYPOPERFUSION
   INTRA RENAL: PARENCHYMAL DISEASE (NEPHROTIC, NEPHRITIC, INTERSTITIAL)
   POST RENAL: URINE FLOW OBSTRUCTION (KIDNEY STONES, BPH)
E) 1. **ESRD** IS THE TERMINAL STAGE OF UREMIA IN WHICH THE GFR IS < 5% OF THE NORMAL.
   2. **AKI** IS THE RAPID DECLINE IN GFR (HOURS TO DAYS) WITH RETENTION OF METABOLIC WASTE PRODUCTS (UREA AND CREATININE) WITH CONCURRENT DYSREGULATION OF FLUID AND ELECTROLYTE IMBALANCE.
   3. **CKD** IS DEFINED AS THE PRESENCE OF DIMINISHED GFR (< 60 ML/MIN/1.73 M2) FOR ATLEAST 3 MONTHS FROM ANY CAUSE OR PERSISTENT ALBUMINURIA

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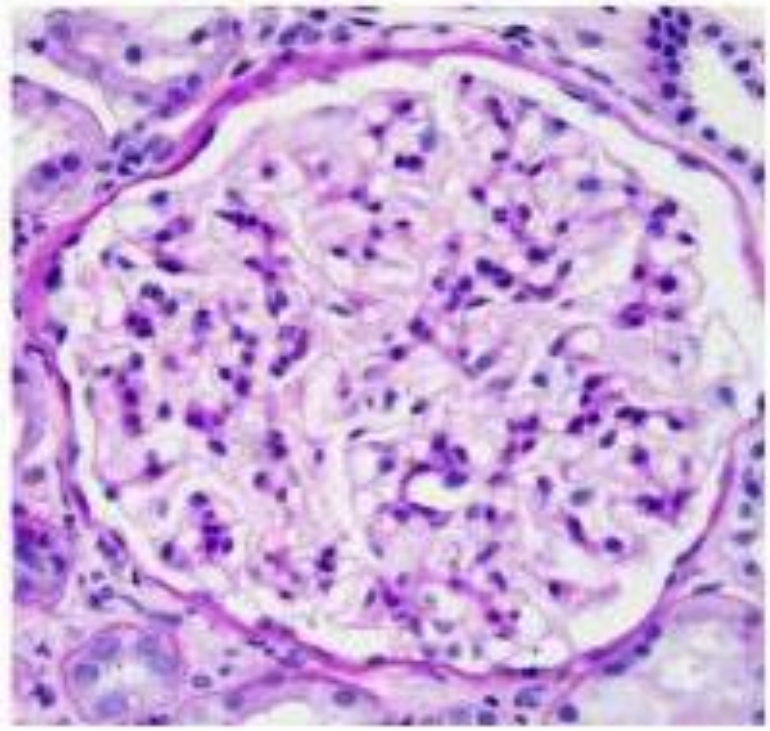
SGD 1:

A 6 Y/O MALE CHILD PRESENTS WITH GENERALIZED EDEMA. HIS 24 HOUR URINE COLLECTION SHOWS PROTEINURIA > 3.5 GRAM/DAY. SERUM ALBUMIN LEVELS ARE LOW. HE IS STARTED ON CORTICOSTEROIDS AND THE CONDITION IMPROVES DRASTICALLY.



LIGHT MICROSCOPY HIGH POWER

1. WHAT IS YOUR DIAGNOSIS?
2. DESCRIBE MORPHOLOGY ON LIGHT AND ELECTRON MICROSCOPY AND IMMUNOFLOURESCENCE.
3. WHAT IS THE PROGNOSIS?

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A 38yr old female pt. of SLE develops progressive renal failure with high level of BUN & creatinine, renal biopsy shows distinctive crescent formation.

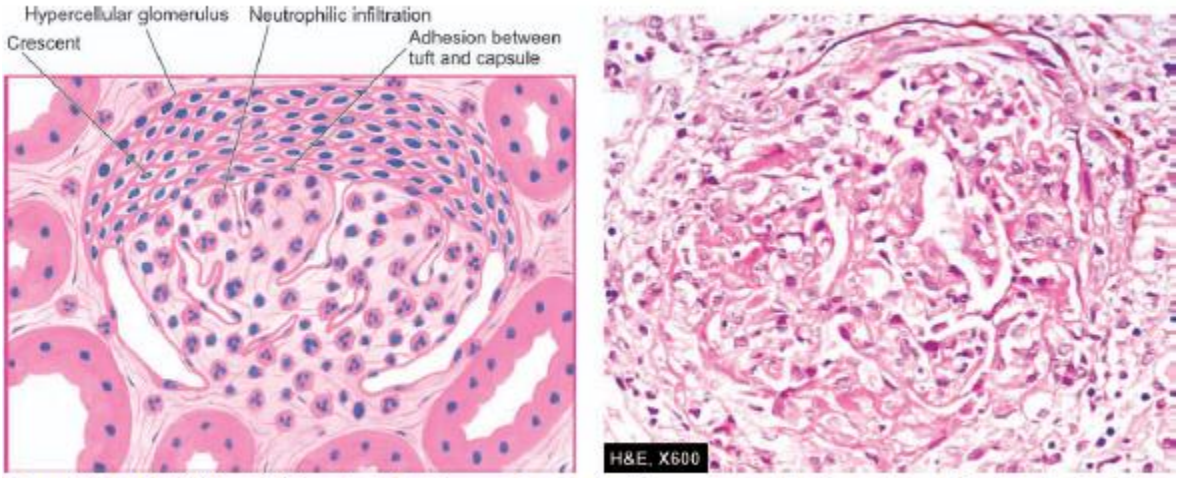

Figure 22.14 RPGN (post-infectious type), light microscopic appearance. There are crescents in Bowman's space forming adhesions between the glomerular tuft and Bowman's capsule. The tuft shows hypercellularity and leucocytic infiltration.

1. What is the most likely diagnosis?
2. What are its different types?
3. What is the syndrome related to this disease associated with pulmonary hemorrhage?

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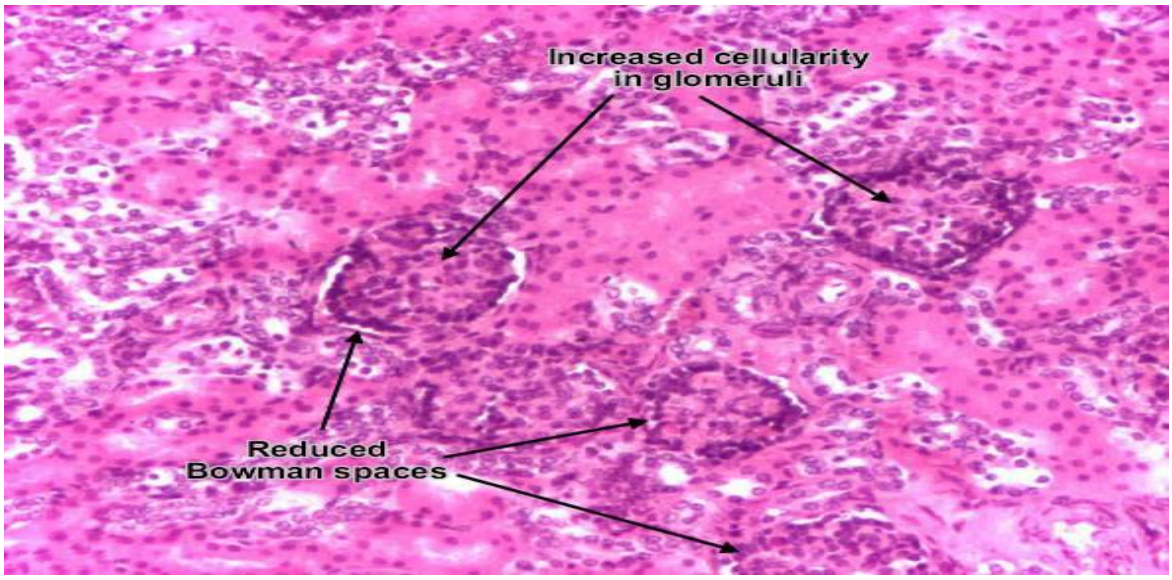
8 year old boy with poor socioeconomic status, presented in OPD of nephrology with fever, malaise, nausea, oligouria, cola-colored urine, 1 -2 weeks after recovery from sore throat.



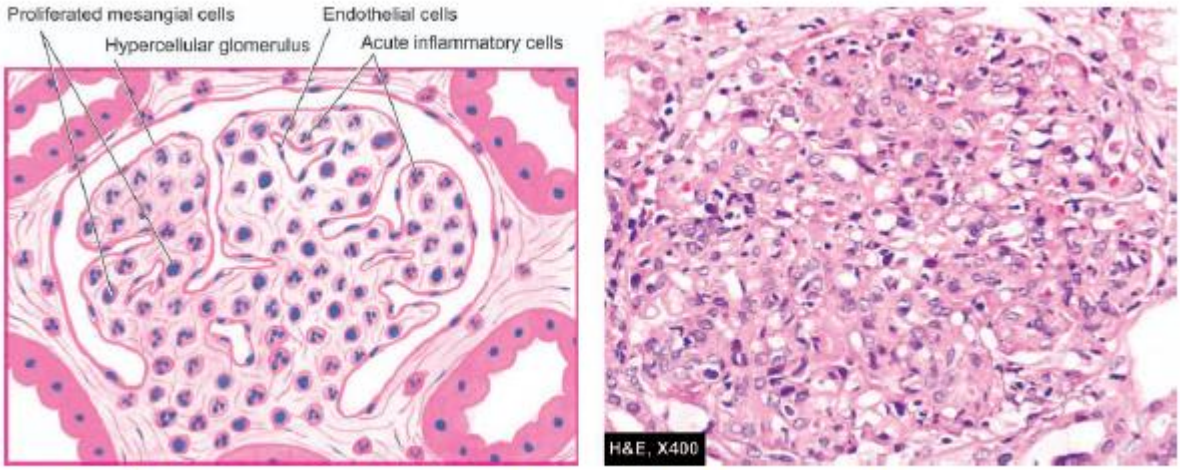


Figure 22.12 Acute post-streptococcal GN, light microscopic appearance. There is increased cellularity due to proliferation of mesangial cells, endothelial cells and some epithelial cells and infiltration of the tuft by neutrophils and monocytes.

1. What is the most likely diagnosis?
2. What is the most likely cause?
3. Give the lab diagnostic tool?
4. What are the findings of this disease on light, electron and immunoflourescent microscopy?

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TABLE 22.10: Distinguishing Features of Three Main Categories of Rapidly Progressive Glomerulonephritis.

	Feature	Type I RPGN (Anti-GBM Disease)	Type II RPGN (Immune Complex Disease)	Type III RPGN (Pauci-immune GN)
1.	*Clinical syndrome*	Nephritic	Nephritic	Nephritic
2.	*Pathogenetic type*	Anti-GBM	Immune-complex	Pauci-immune
3.	*Immunofluorescence*	Linear Ig and C3	Granular Ig and C3	Sparse or absent Ig and C3
4.	*Serologic markers*			
	i) Serum C3 level	Normal	Low-to-normal	Normal
	ii) Anti-GBM antibody	Positive	Negative	Negative
	iii) ANCA	Negative	Negative	Positive
5.	*Underlying cause*	Idiopathic	Idiopathic	Idiopathic
		Goodpasture's syndrome, SLE, vasculitis, Wegener's granulomatosis, Henoch-Schonlein purpura	Post-infectious (post-streptococcal GN)	Polyarteritis nodosa, Wegener's granulomatosis

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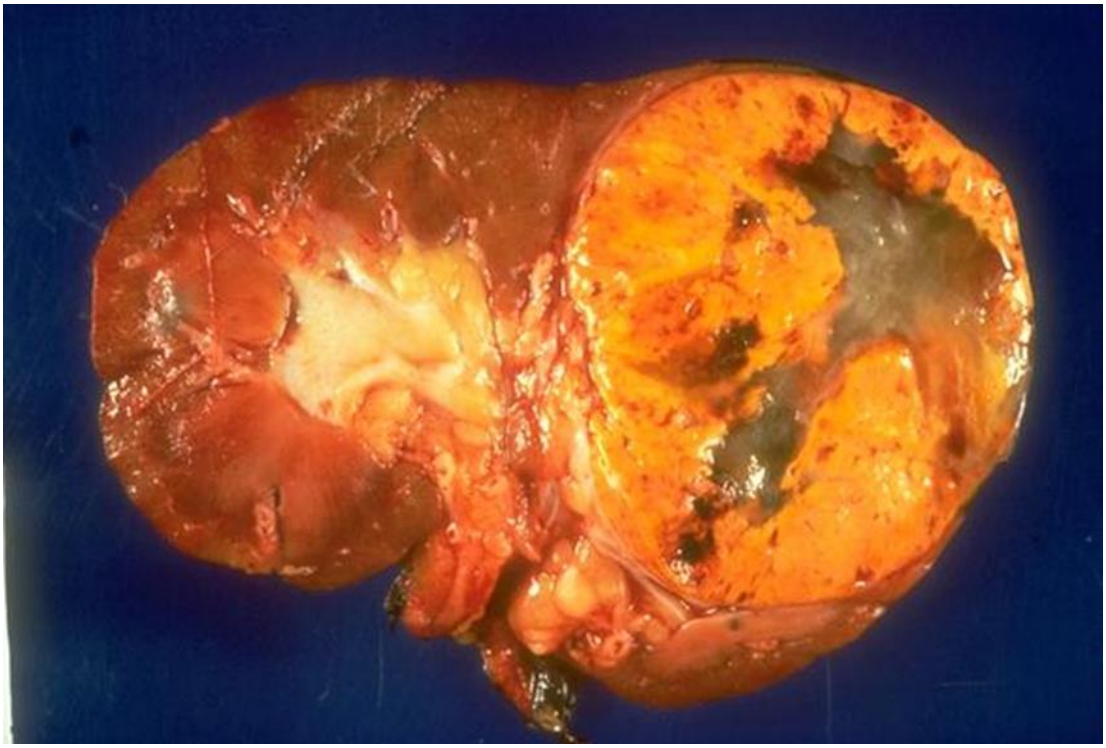
Topic renal pathology

Renal cell carcinoma.

A 5 year old boy presented with abdominal mass.Ultrasonography revealed a mass attached to upper pole of right kidney.



Q-1 what is the diagnosis

Describe its gross appearance

What is the prognosis of lesion

1- Wilms tumour
2- Well circumscribed with areas of haemorrhage and necrosis.
3- Survival rate for wilmstumour is 90% with treatment combining chemotherapy radiation and surgery.

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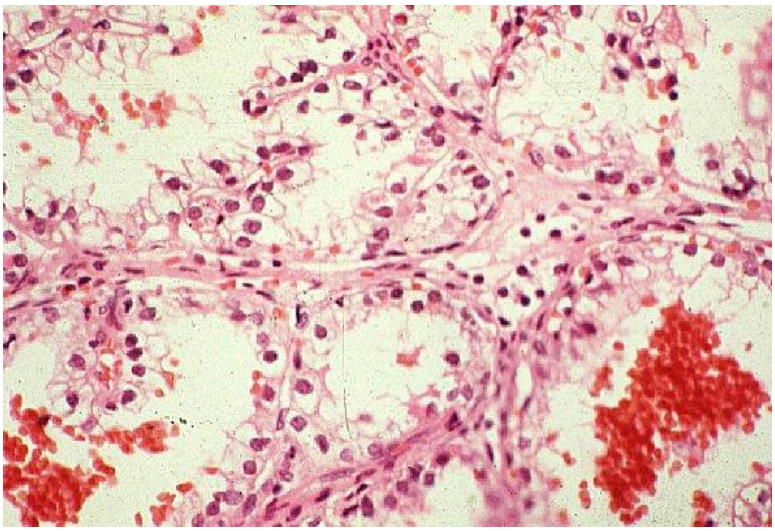
Topic renal system

Photomicrograph shows a section from a tumour from kidney of a 50 year old male patient.



1- Give the diagnosis.
2- What hereditary syndrome is associated with this lesion.
3- Name two ectopic hormones produced by this lesion.

Key

1- Renal cell carcinoma
2- Von hippel landau syndrome
3- PTH, renin.

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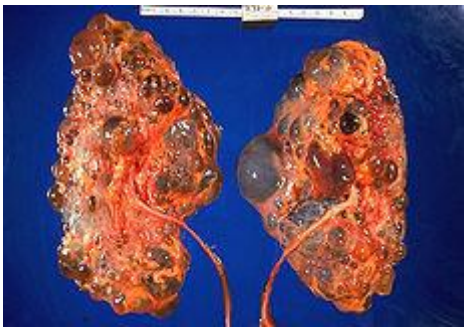
Renal

Longitudinally cut section of a kidney from a 40 year old male who developed renal failure.



1- How would u describe this appearance.(1.5)
2- What is the mode of inheritance of this condition(1)
3- Which other organ develops this condition.(1)

Key

1- Adult polycystic disease(1.5)
2- Autosomal dominant(1)
3- Liver spleen pancreas.(1)

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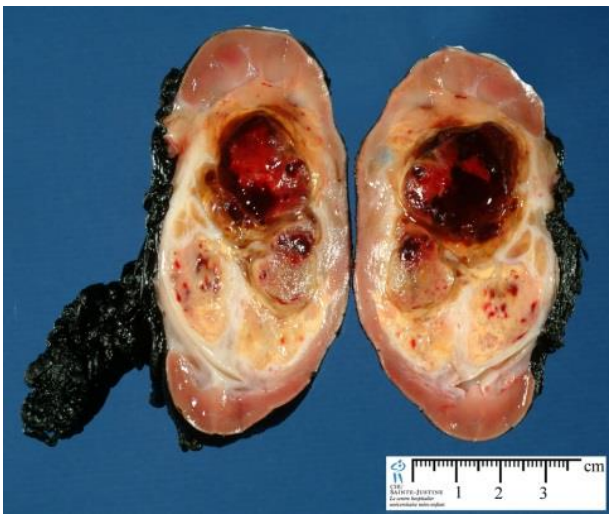

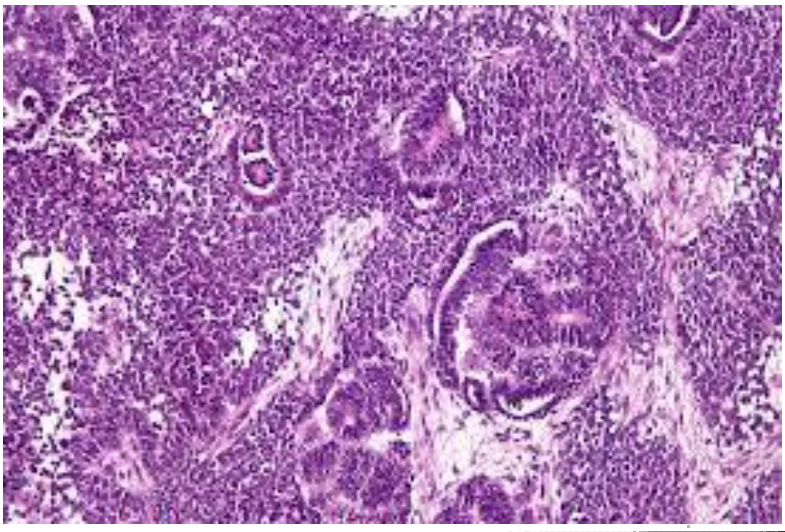

Table 1

National Wilms' Tumor Study (NWTS) Staging System

Stage	Description
I	Tumor is limited to the kidney and completely excised. Surface of the renal capsule is intact. Tumor was not ruptured before or during removal.
II	Tumor extends beyond the kidney, but is completely removed. Vessels outside the kidney substance are infiltrated or contain tumor thrombus. The tumor may have been biopsied, or there has been local spillage of tumor confined to the flank.
III	Residual nonhematogenous tumor is confined to the abdomen: (1) lymph nodes on biopy are found to be involved in the hilus, para-aortic chains, or beyond; (2) diffuse peritoneal contamination by tumor, such as spillage beyond the flank; (3) peritoneal implants; (4) the tumor extends beyond the surgical margins either microscopically or grossly; and/or (5) the tumor is not completely resectable because of local infiltration into vital structures.
IV	Hematogenous metastases are present.
V	Bilateral renal involvement is noted at diagnosis.

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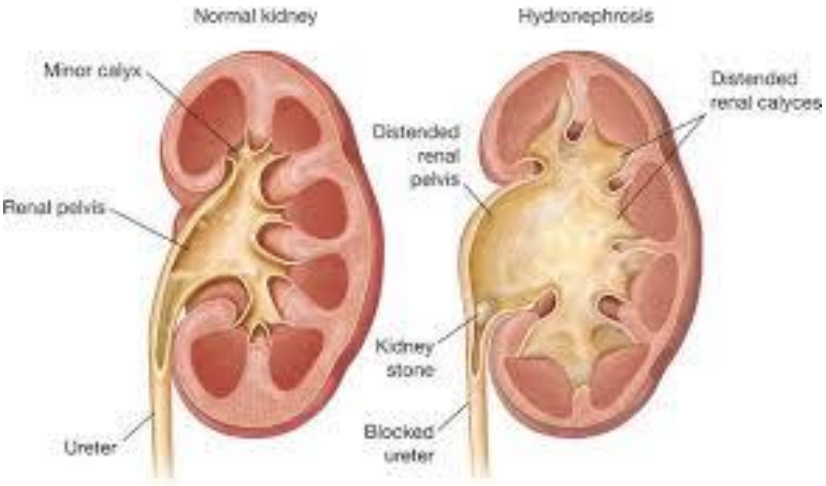


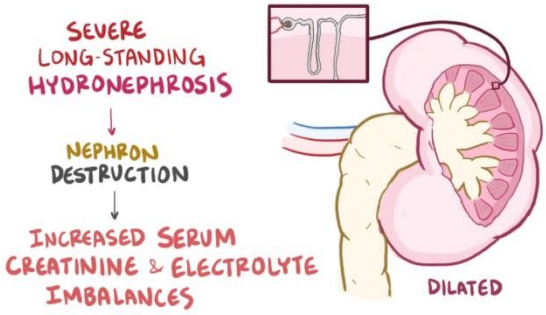
Hydronephrosis (Grading)

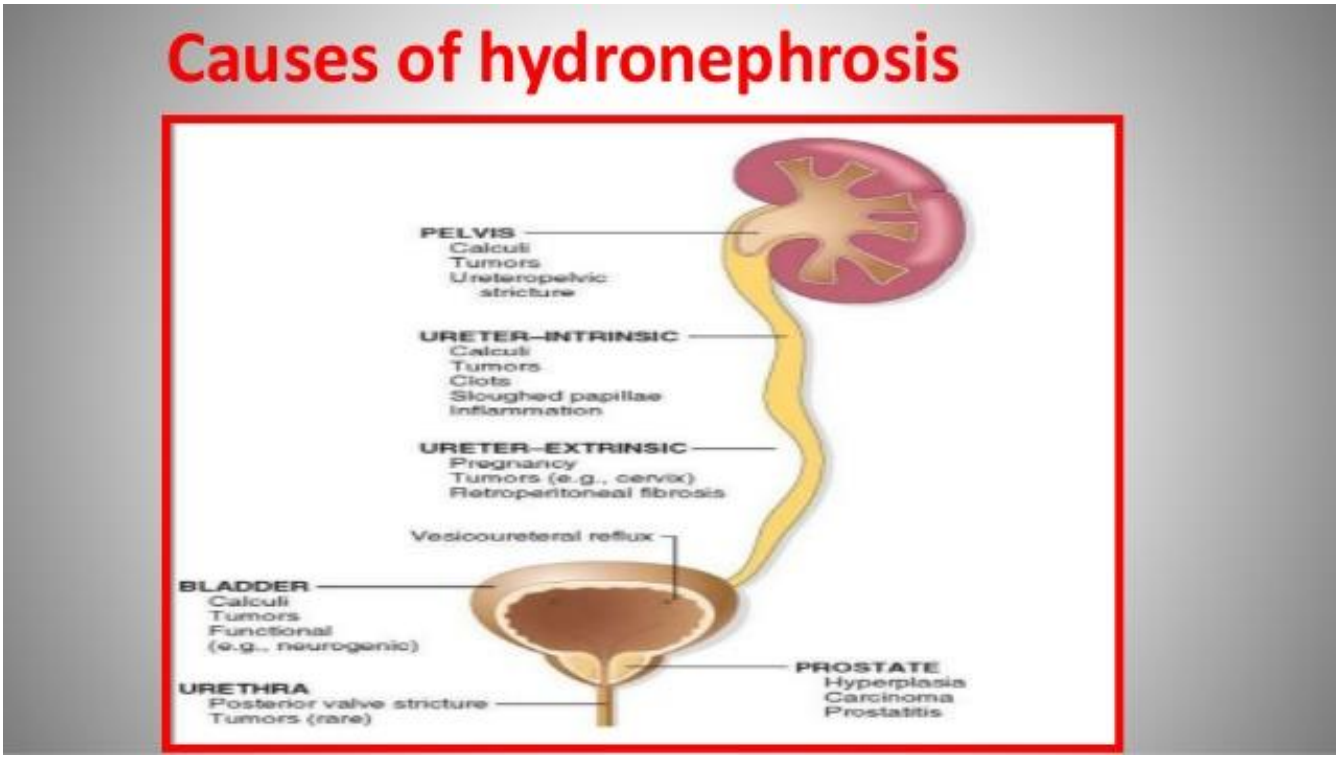
Society of Fetal Urology (SFU)Grading System

- Grade 0 No splitting of the central renal echo complex
- Grade I Slight splitting of the central renal echo complex
- Grade II Dilated renal pelvis and some fluid in calyces
- Grade III Pelvis dilated beyond sinus, calyces uniformly dilated
- Grade IV Pelvis and calyces dilated, parenchyma thin

Mild hydronephrosis (Grade I or II)
Moderate hydronephrosis (Grade III)
Severe hydronephrosis (Grade IV)

Fernbach SK, Maizels M, Conway JJ. Ultrasound grading of hydronephrosis: introduction to the system used by the Society for Fetal Urology. Pediatr Radiol. 1993;23:478-80





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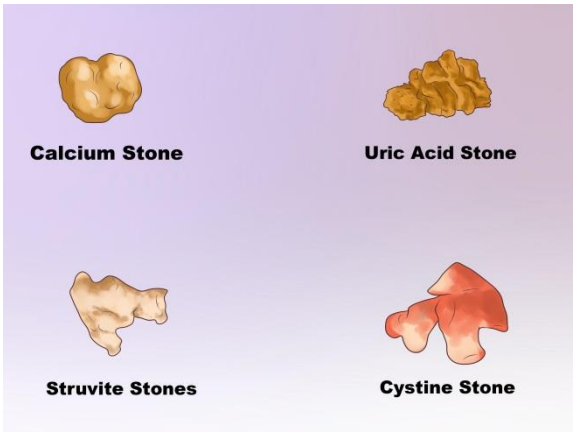
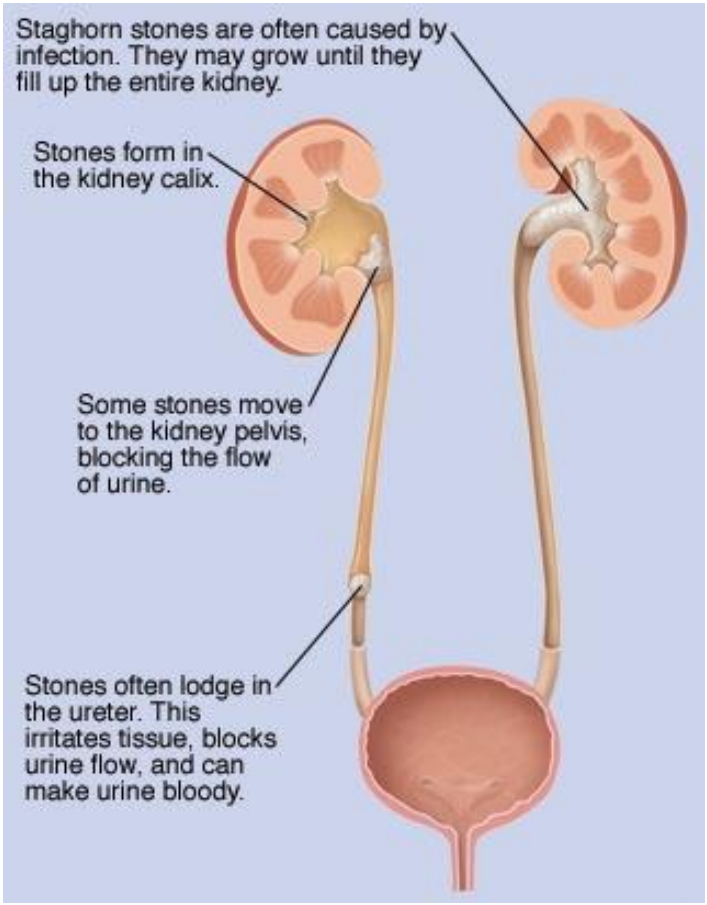

Calcium Stone
Uric Acid Stone
Struvite Stones
Cystine Stone


Staghorn stones are often caused by infection. They may grow until they fill up the entire kidney.
Stones form in the kidney calix.
Some stones move to the kidney pelvis, blocking the flow of urine.
Stones often lodge in the ureter. This irritates tissue, blocks urine flow, and can make urine bloody.