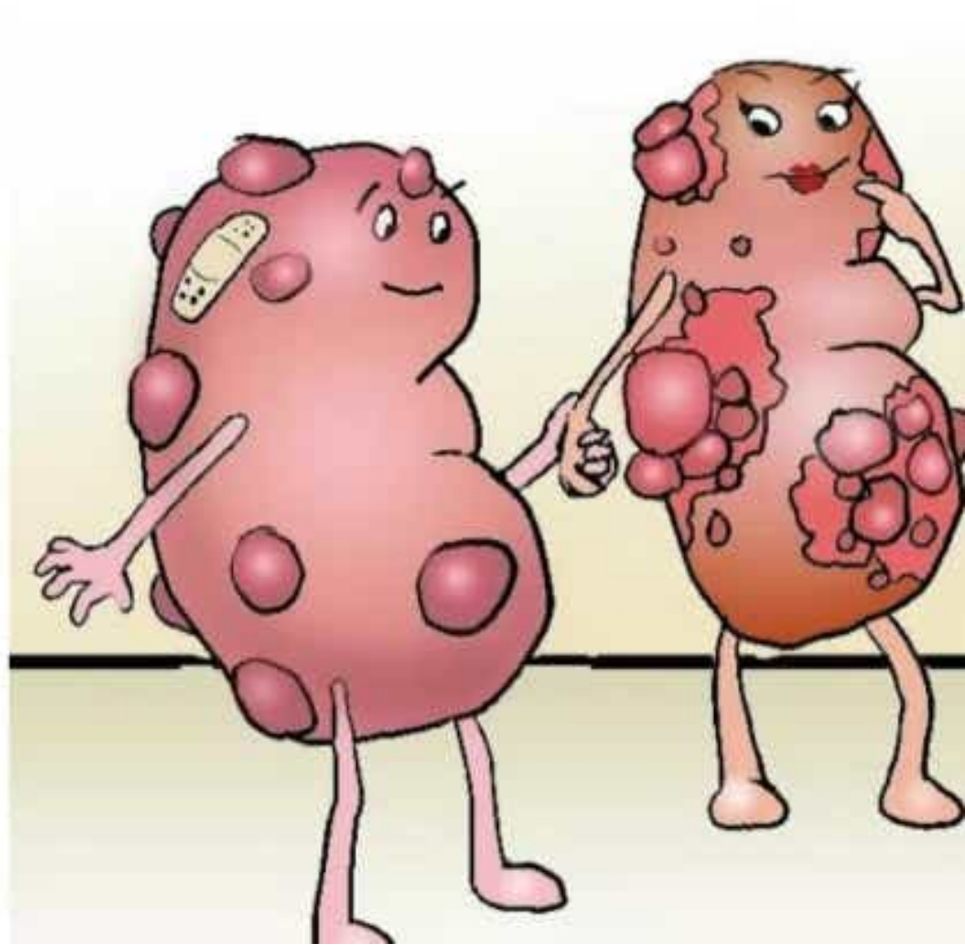
- **Poor prognosis:**

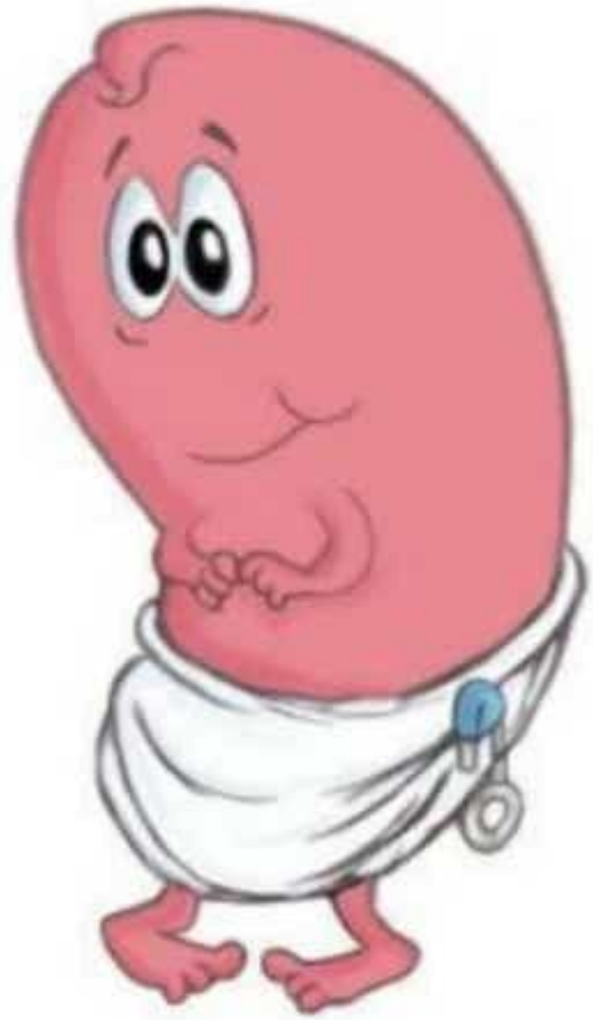
- Renal biopsy- diffuse mesangial proliferation
  - segmental sclerosis
  - endocapillary proliferation
  - Tubulointerstitial fibrosis

Secondary Ig A Nephropathy

CYSTIC DISEASES OF THE KIDNEY



- Heterogenous group of disorders
- Neoplastic/ non neoplastic
- Congenital/ acquired
- Most common- **Congenital non neoplastic**
- Presentation – abdominal mass
  - infection
  - respiratory distress.....



Classification of cystic lesions of kidney

- **Potter Classification** (Congenital cysts)

  I- **infantile polycystic kidney disease**

  II- **multicystic dysplastic kidney disease**

  III- **adult polycystic kidney disease**

Table 20.2 **Classification of cystic lesions of the kidney.**

A. NON-NEOPLASTIC CYSTIC LESIONS
   I. Renal multicystic dysplasia (Potter type II)
   II. Polycystic kidney disease (PKD)
      1. Adult (autosomal dominant) polycystic kidney disease (ADPKD) (Potter type III)
      2. Infantile (autosomal recessive) polycystic kidney disease (ARPKD) (Potter type I)
   III. Medullary cystic disease
      1. Medullary sponge kidney (MSK)
      2. Nephronophthiasis-medullary cystic disease complex
   IV. Simple renal cysts
   V. *Acquired renal cysts* (i. dialysis-associated cystic disease, ii. hydatid cyst, iii. tuberculosis, iv. renal cell carcinoma, v. traumatic intrarenal haematoma)
   VI. *Para-renal cysts* (i. Pyelocalyceal, ii. hilar lymphangiectatic, iii. retroperitoneal, iv. perinephric pseudocysts from trauma)

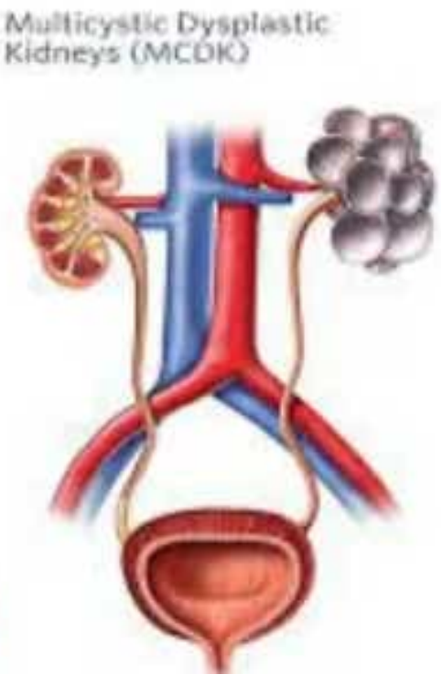
B. NEOPLASTIC CYSTIC LESIONS
   I. Cystic nephroma (page 681)
   II. Cystic partially-differentiated nephroblastoma (CPDN)
   III. Multifocal cystic change in Wilms' tumour (page 684)

I. Multicystic Renal Dysplasia

- Newborn/infants

- Disorganised metanephrogenic differentiation
  - Developmental defect

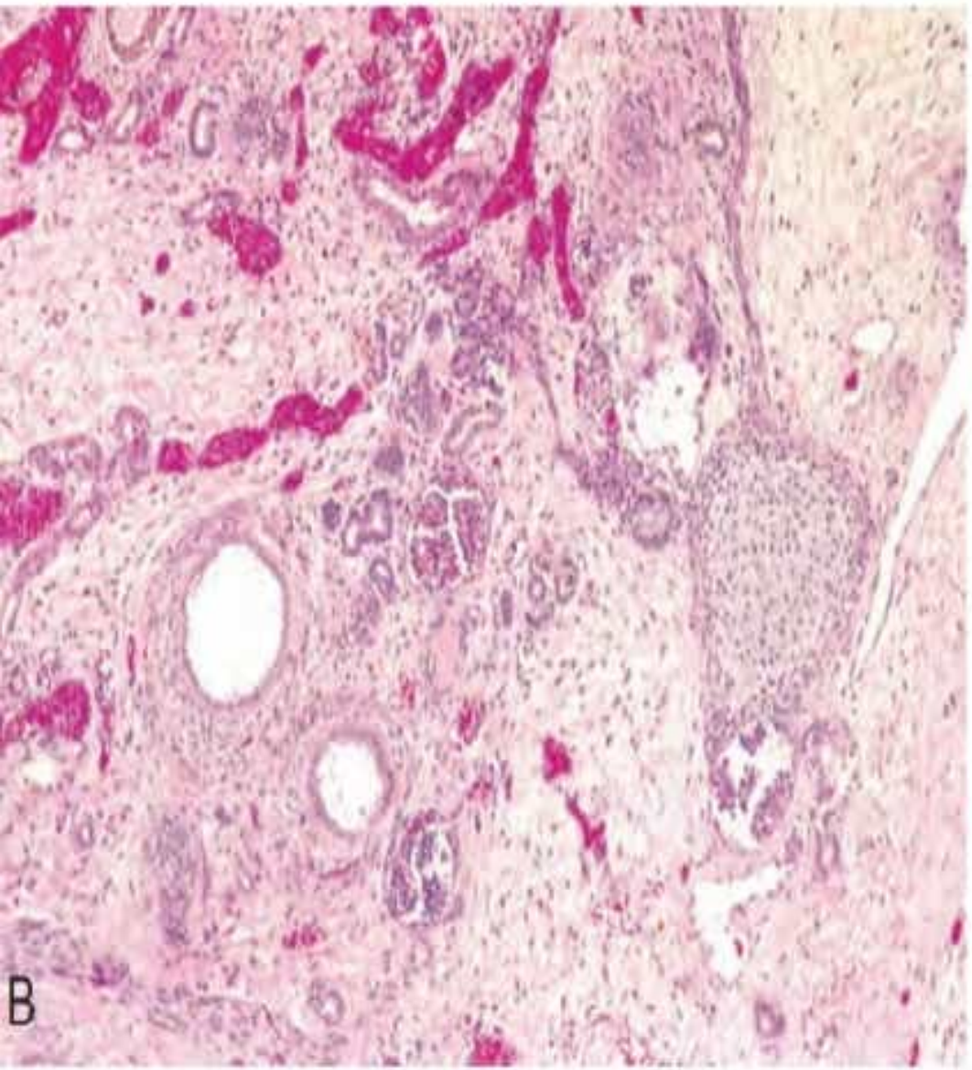
- Sporadic/familial/as part of syndromes



- Gross morphology:

“ Bunch of grapes”

- Microscopy:



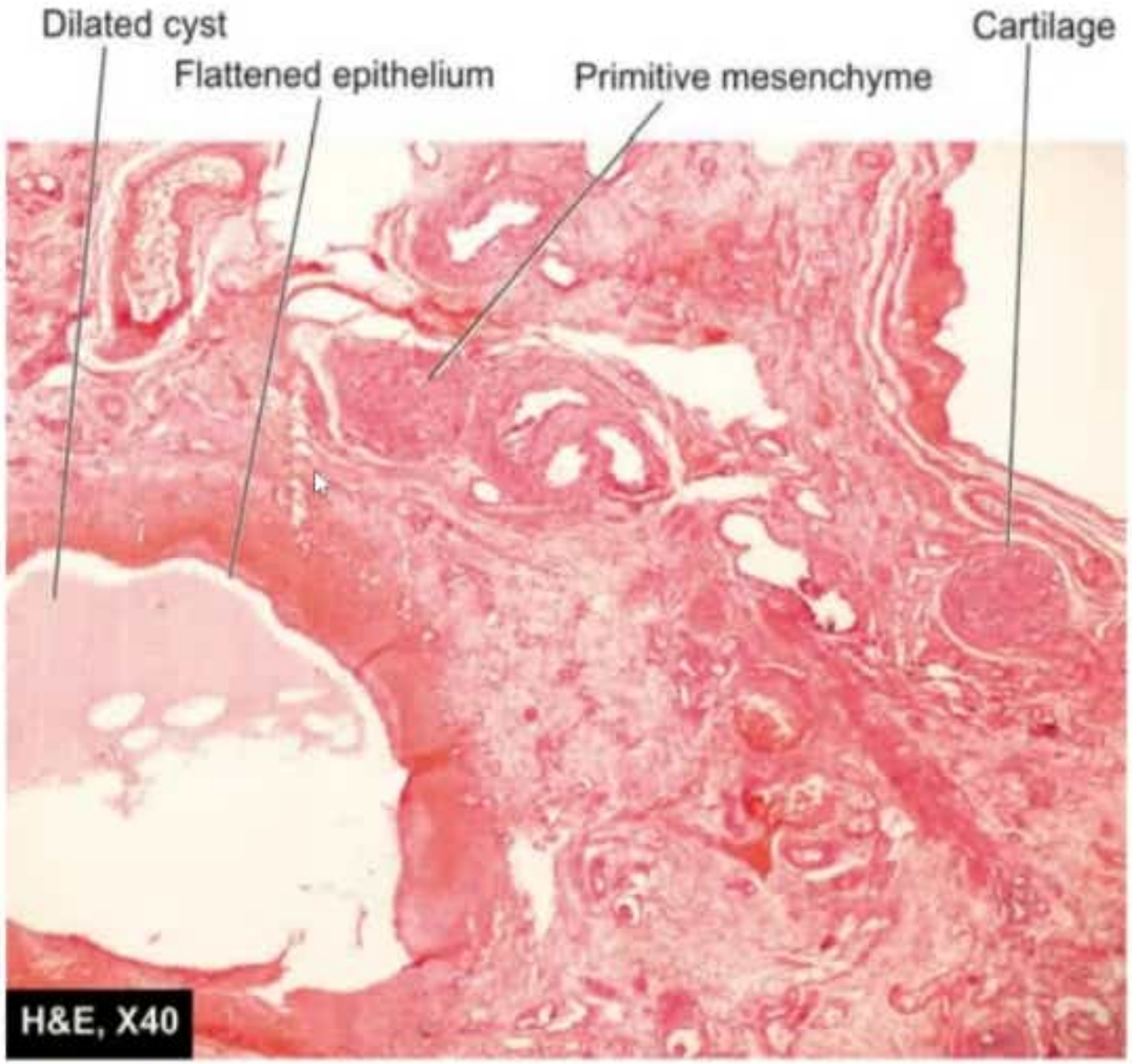


Figure 20.8 Renal cystic dysplasia. There are cysts lined by flattened epithelium while the intervening parenchyma consists of primitive connective tissue and cartilage.

- Presentation:

  Flank mass

- Prognosis: U/L- removal of abnormal kidney

  - excellent prognosis

  B/L – Death in infancy

  - Renal transplantation

II. Polycystic Kidney Disease

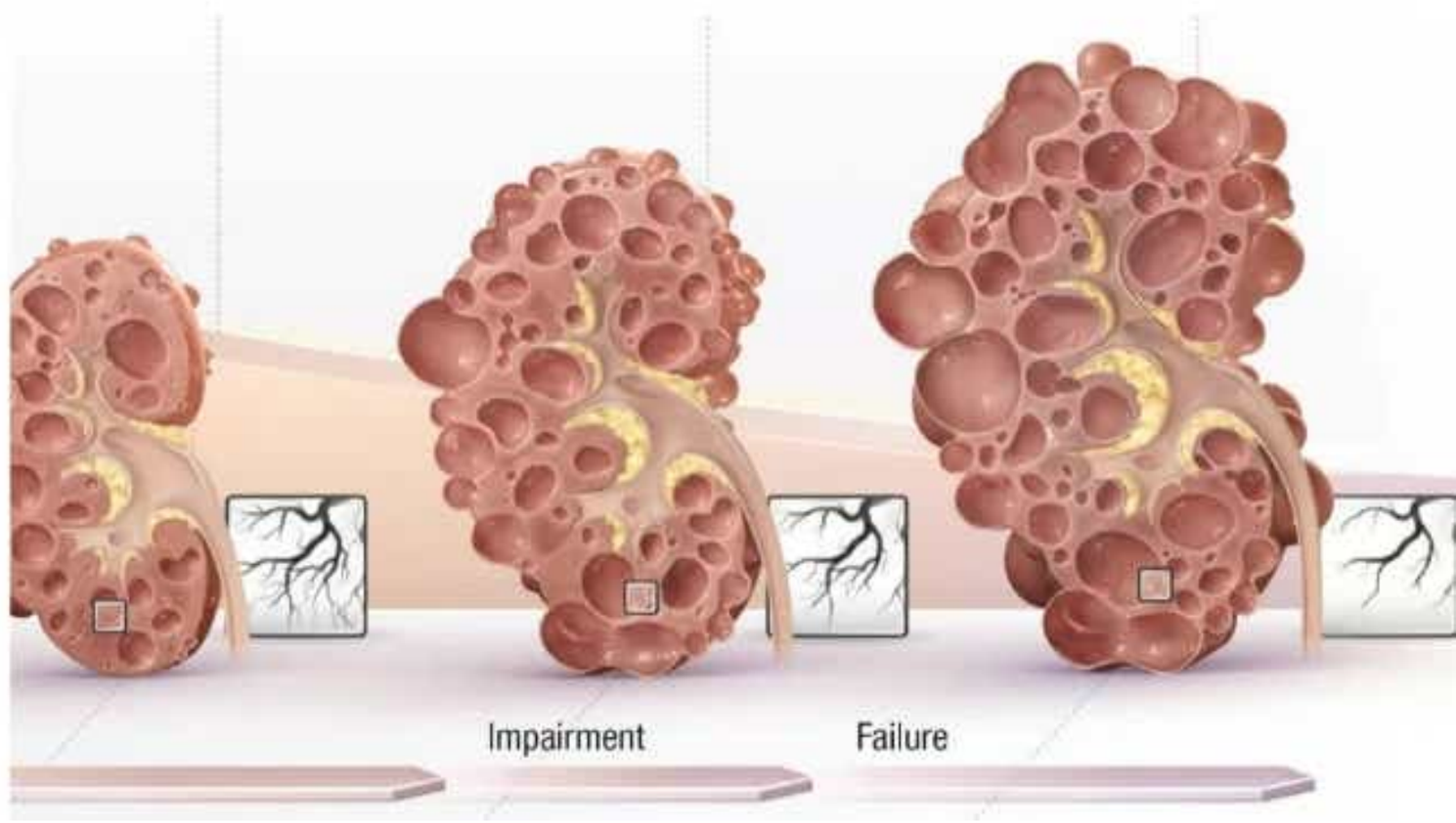
- 2 types

- Adult type
  - **ADPKD/ Autosomal Dominant Polycystic Kidney Disease**

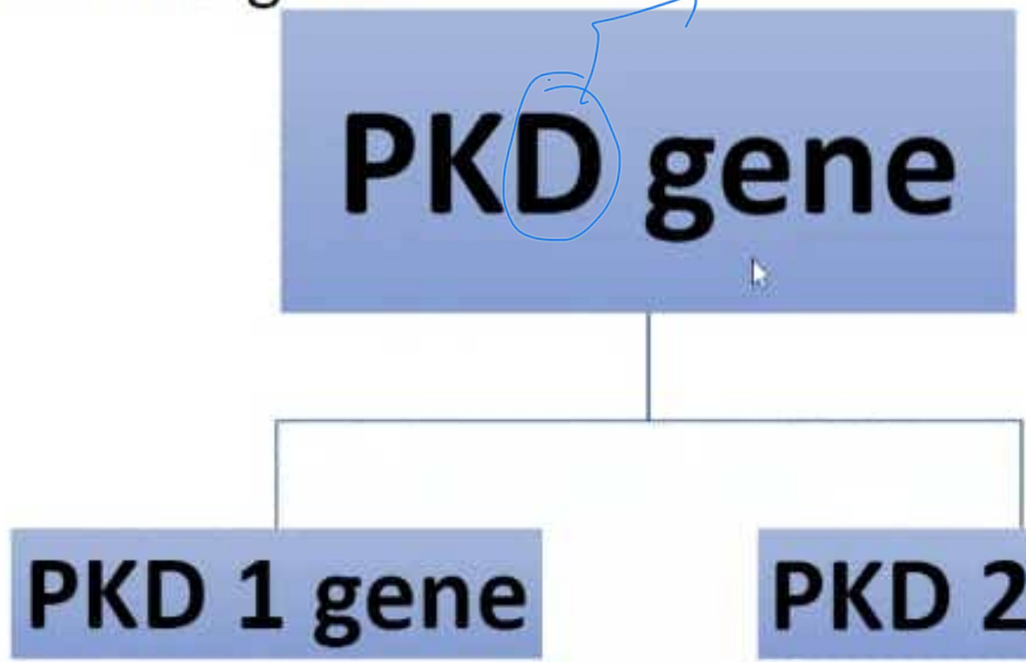
- Infantile Type
  - **ARPKD/Autosomal Recessive Polycystic Kidney Disease**

1. ADULT POLYCYSTIC KIDNEY DISEASE/ ADPKD

- Bilateral & diffuse
- Autosomal dominant



- Mutations in **PKD** gene



dominant

Polycystic kidney disease

1 → 2

4

chr 16

16

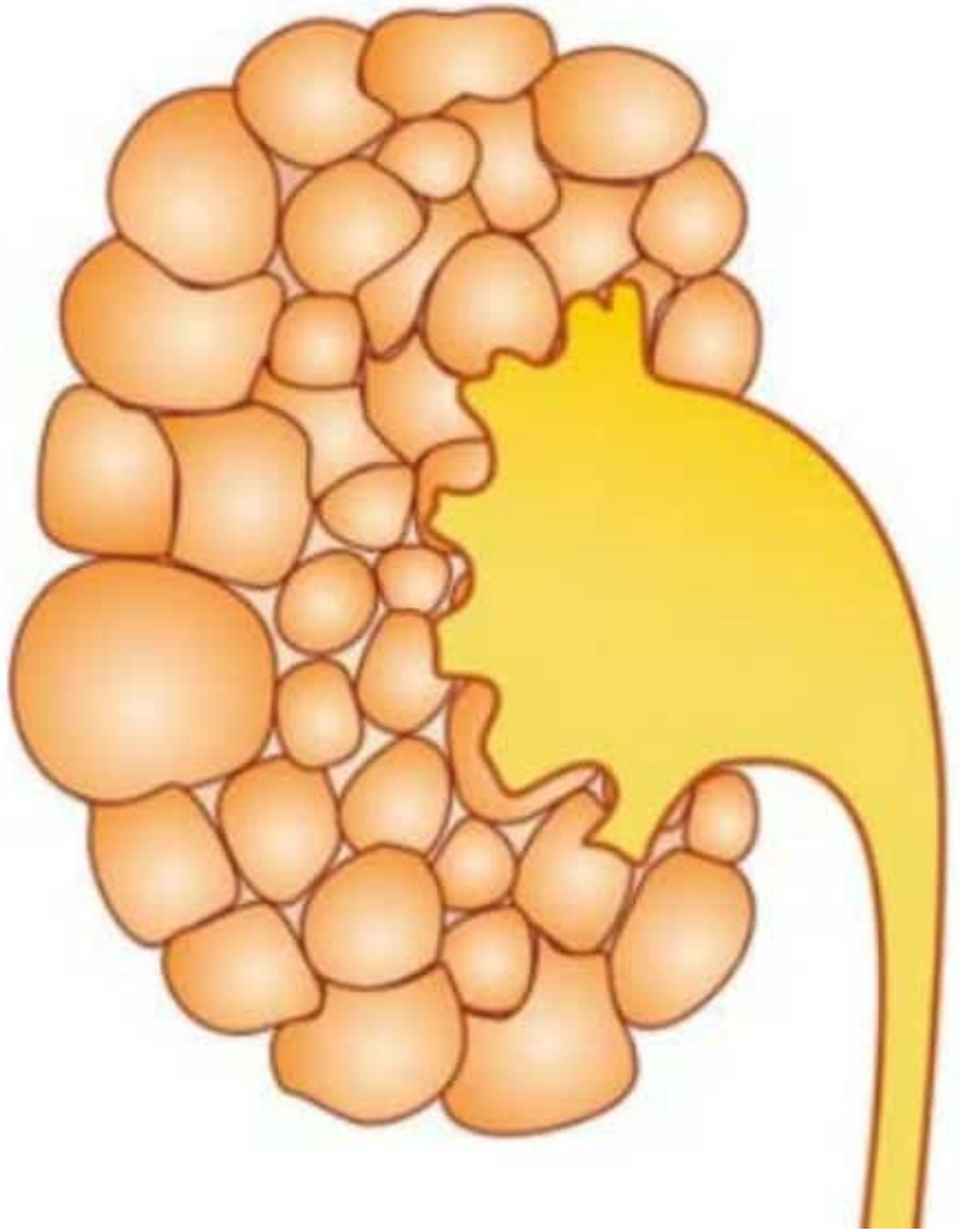
- 85%
- Chromosome **16**
- **POLYCYSTIN-1**
- Cell matrix interaction

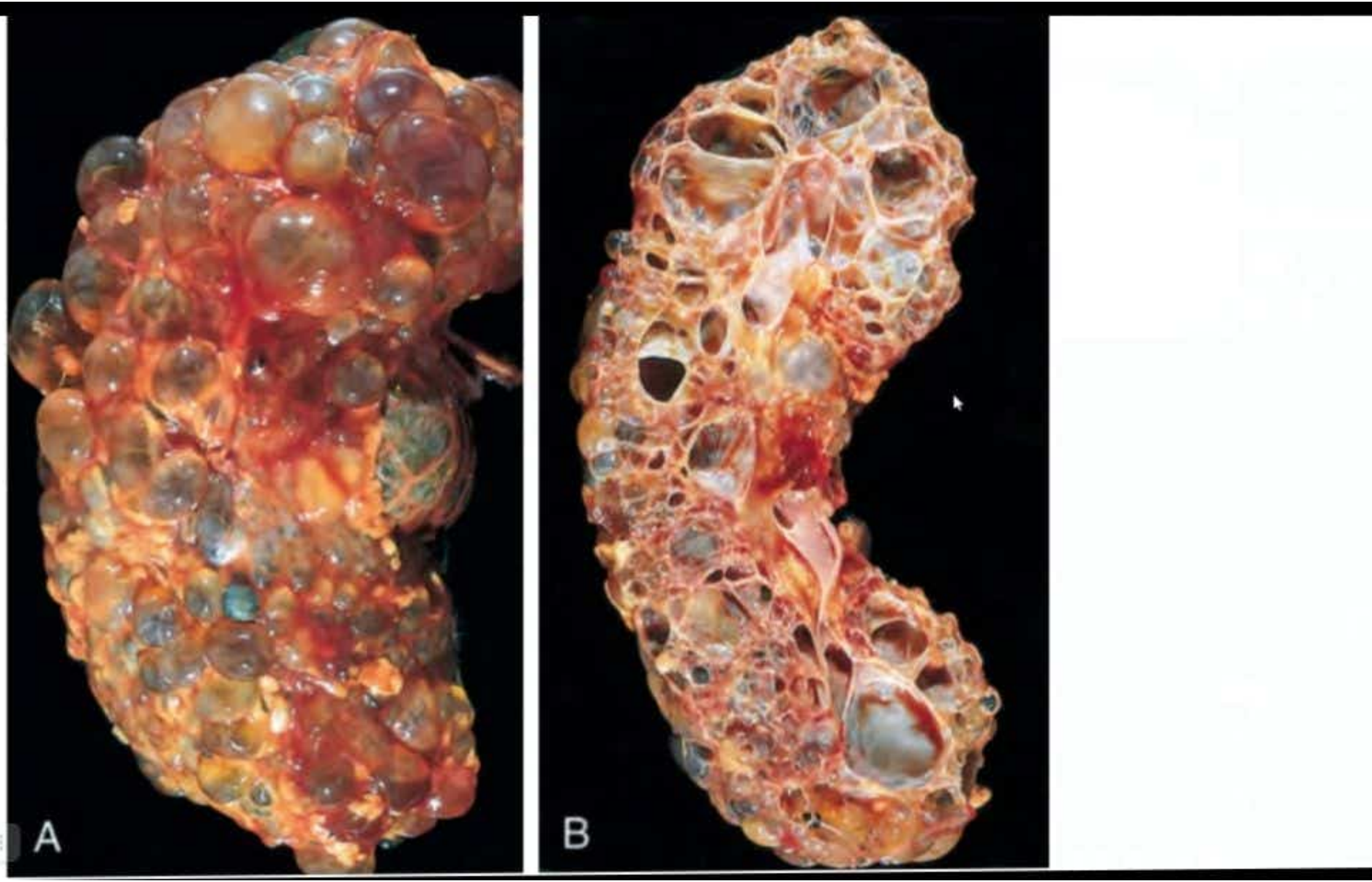
4

- 15%
- Chromosome **4**
- **POLYCYSTIN-2**
- Calcium permeable membrane channel

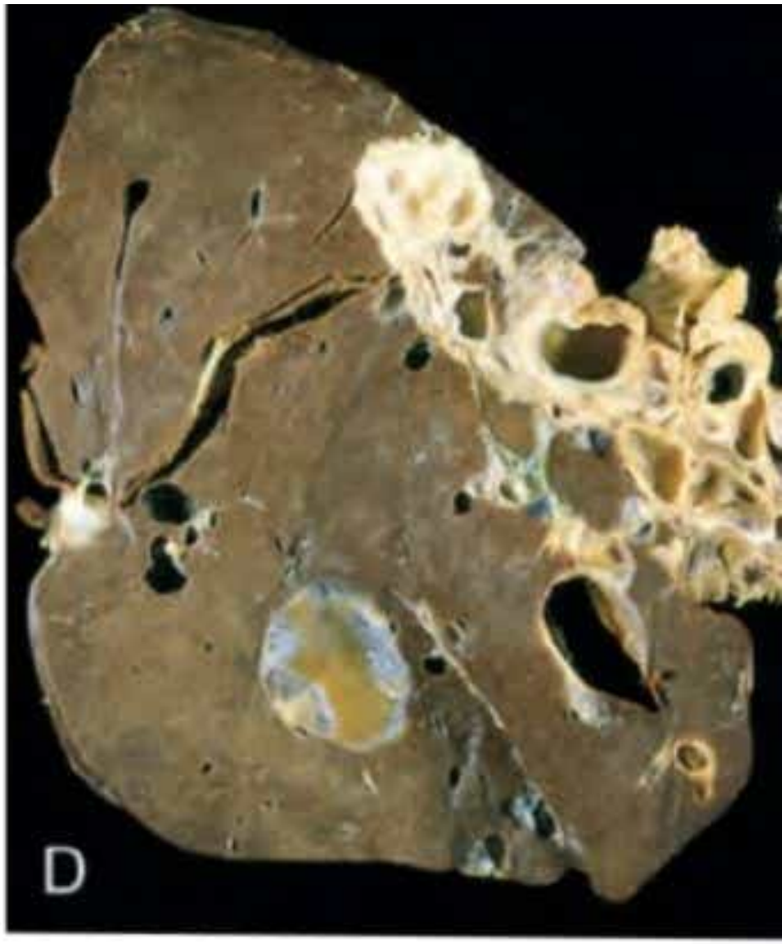
- **Gross-**

- Enlarged, heavy
- External surface- lobulated
- C/S: No CMD differentiation
  -replacement of
  normal parenchyma
  by cysts
- Vs Hydronephrosis.




A
B

- **Microscopy:**
- Cysts originate from any part of the nephron
- Bowman's capsule
- Tubules



- **Clinical features**:
- 3rd to 5th decade
- Dull aching pain in lumbar region

- Association with cysts in liver/ less frequent- pancreas, lungs, spleen…

2. Infantile polycystic kidney disease/ ARPKD

- Bilateral
- Autosomal recessive

InF ants AR e L ittle

ibrocystin

adiating cysts

iver Cirrhosis/ Failure

- Mutations in **PKHD1** gene
- Chromosome **6**
- **FIBROCYSTIN**
- Cilia function

PKHD1

6

- **Gross:**
- Enlarged
- Smooth external surface
- C/S- Sponge like appearance
  - dilatation of collecting tubules.

- **Microscopy:**
- Cuboidal to low columnar epithelium

- **Clinical features**:

- Early onset renal failure
- Associated cysts in other organs.
- Liver– Congenital hepatic fibrosis

Table 20.3 Contrasting features of autosomal dominant (adult) and autosomal recessive (infantile) polycystic kidney disease (ADPKD versus ARPKD).

	FEATURE	ADPKD	ARPKD
1.	*Inheritance*	Autosomal dominant	Autosomal recessive
2.	*Cytogenetic defect*	Chromosome 16 (85%): ADPKD-1 Chromosome 4 (15%): ADPKD-2	Chromosome 6
3.	*Mutations*	PKD 1 gene (85%) PKD 2 gene (15%)	*6p21 PKHD1*
4.	*Incidence*	1:400 to 1:1000	1:20,000
5.	*Age at presentation*	Adults (3rd to 5th decades)	Infancy, perinatal
6.	*G/A*	Symmetric bilateral enlargement Macrocysts	Micro- and macrocysts radiating from medulla to outer cortex Enlarged, sometimes asymmetric, sponge-like
7.	*M/E*	Cysts derived from all parts of nephron (glomeruli, tubules)	Cysts from dilated collecting ducts
8.	*Other manifestations*	Intracranial aneurysms, cysts of other organs	None

III. MEDULLARY CYSTIC DISEASE

- 2 types:

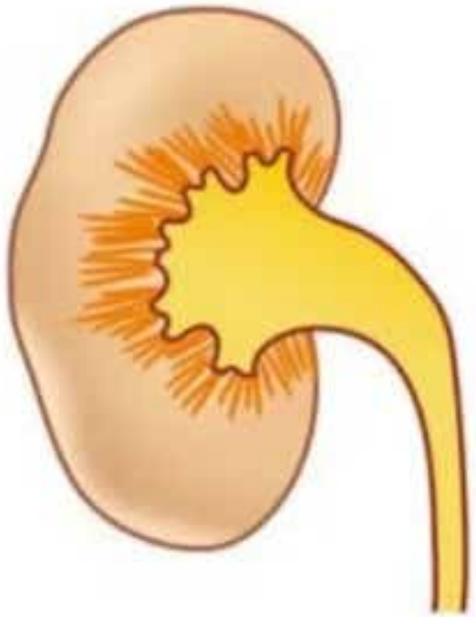
1. **Medullary Sponge Kidney**
2. **Nephronophthiasis- Medullary cystic disease complex**

1. Medullary sponge kidney

- Multiple cystic dilatations of papillary ducts
- Autosomal Dominant
- Adults
- **Clinical features**: asymptomatic

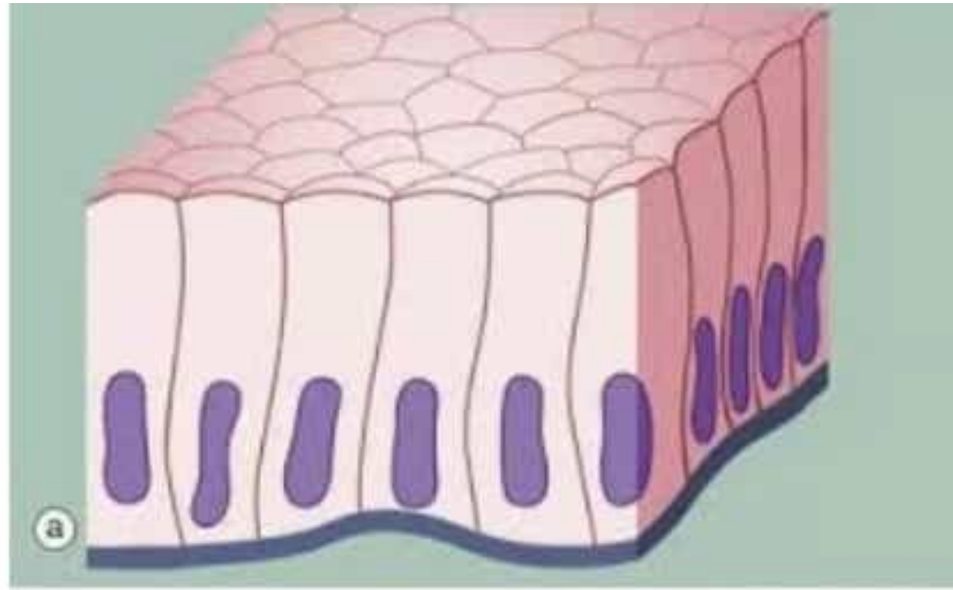
  flank pain, dysuria, hematuria, passage of sandy material in urine

- **Morphology:**
- Enlarged/ normal/ shrunken
- Cut surface- small cysts in medulla, not in cortex.



B, MEDULLARY SPONGE KIDNEY (MSK)

Figure 20-45 Medullary cystic disease. Cut section of kidney showing cysts at the corticomedullary junction and in the medulla.



- **Microscopy:**

- Cyst lining by tall columnar/ cuboidal/ transitional/ squamous

2.Nephronophthiasis- Medullary cystic disease complex

- Most common cause of end stage renal disease in children and young adults

- 4 variants- infantile
  juvenile (most common)
  adolescent
  adult

- Association – Retinitis Pigmentosa
  Mental Retardation
  Cerebellar malformation
  Liver fibrosis

- **Pathogenesis:**
- 7 genes involved
- 5 genes- **NPHP1-5** (infantile, Juvenile, adolescent)
- **NEPHROCYSTIN**
- Ciliary function
- 2 genes- **MCKD 1,2** (Adults)

- **Gross:**
- Small contracted kidneys

- **Microscopy:**
- Cysts at Corticomedullary junction
- Lined by flattened / cuboidal epithelium

- **Clinical features:**
- Polyuria+ Polydypsia (tubular malfunction)------ESRD

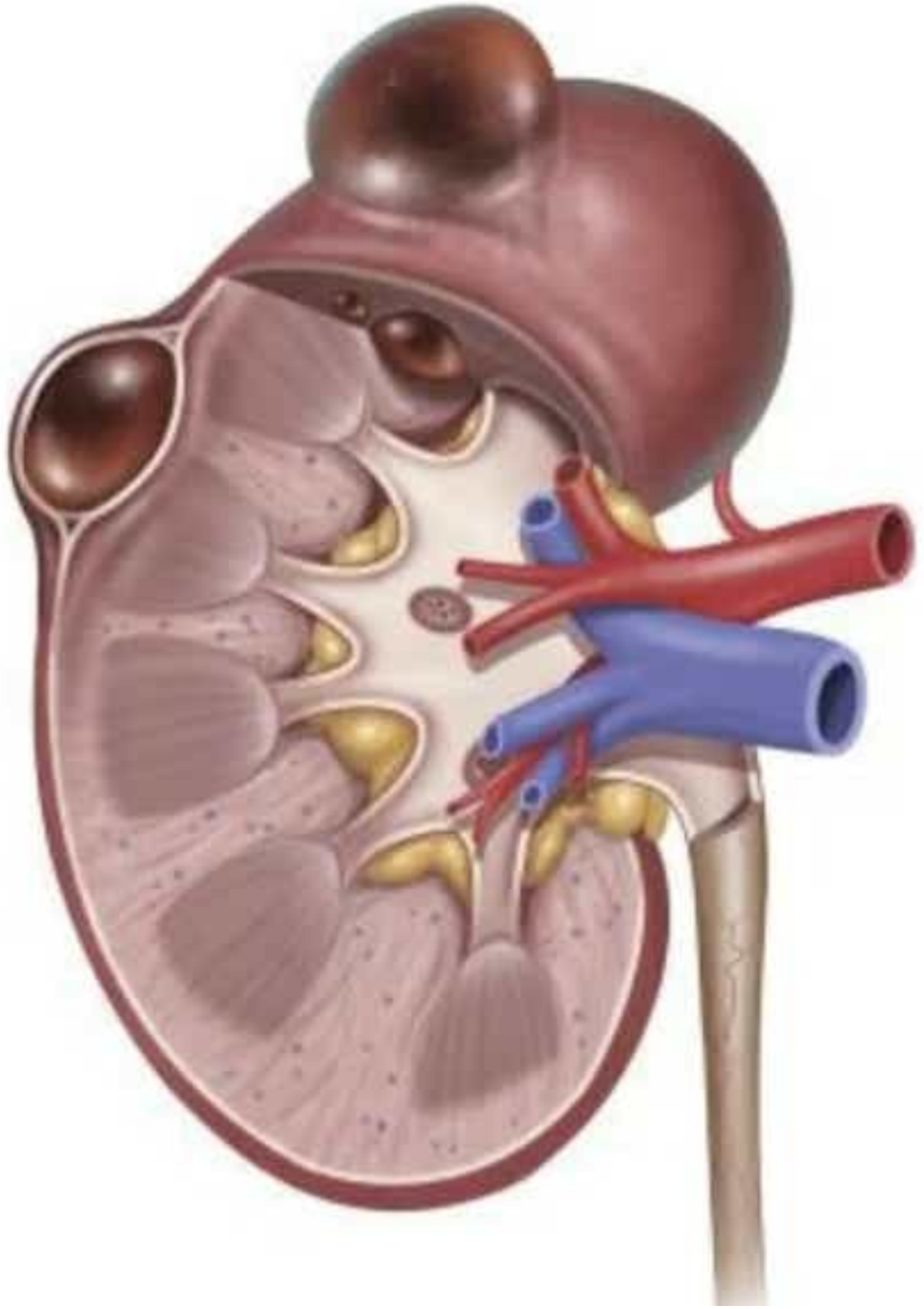
IV. Simple renal cysts

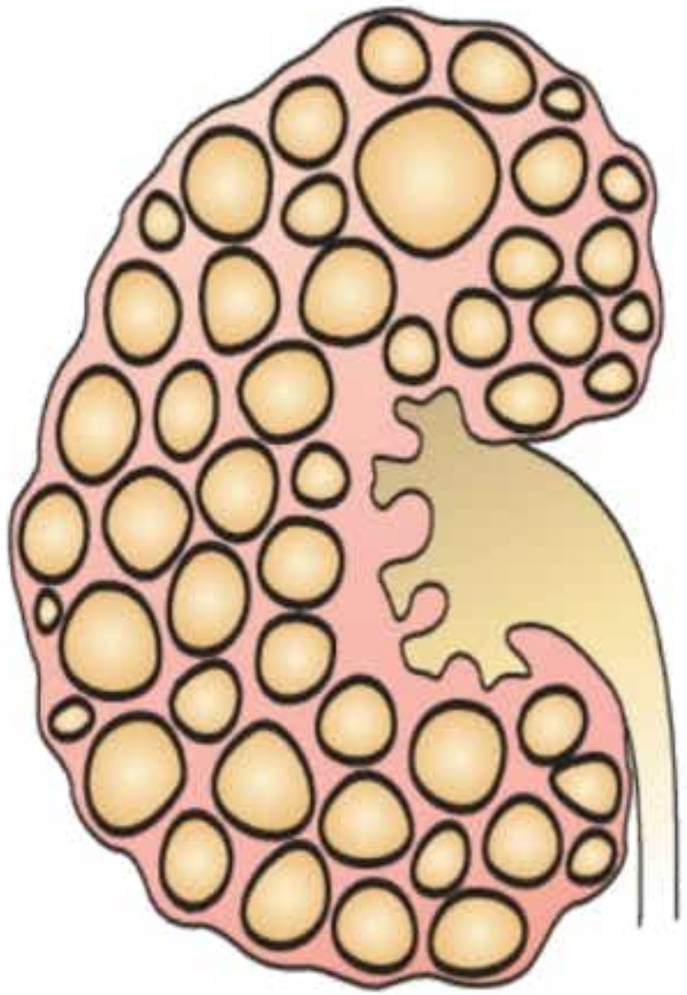
- Very common autopsy finding
- >50 years

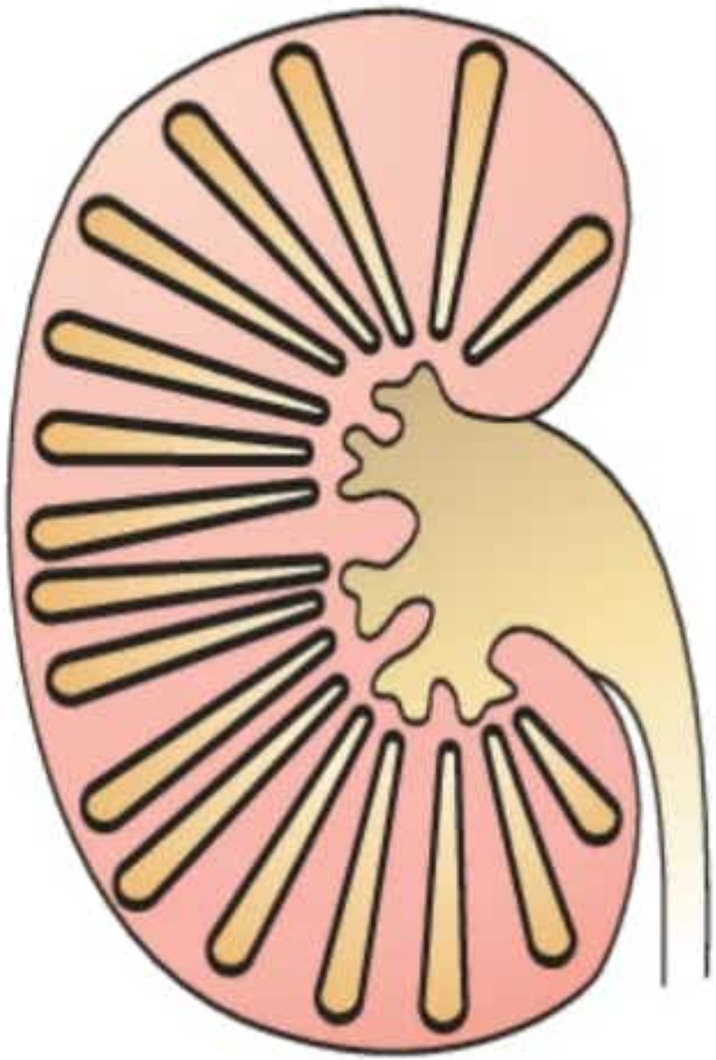
- **Clinical features:**
- Usually asymptomatic

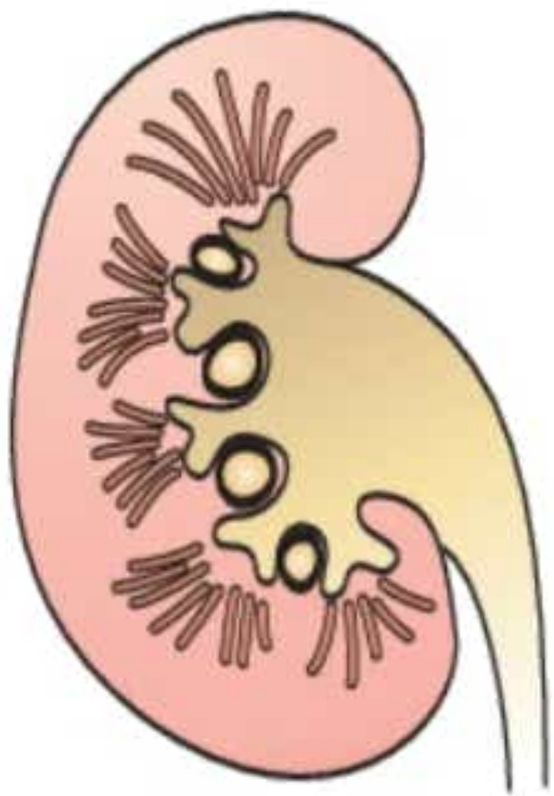
- **Gross:**
- Cortical cysts
- Upto 10cm in diameter
- Cyst wall- yellowish white, translucent
- Content- clear thin fluid

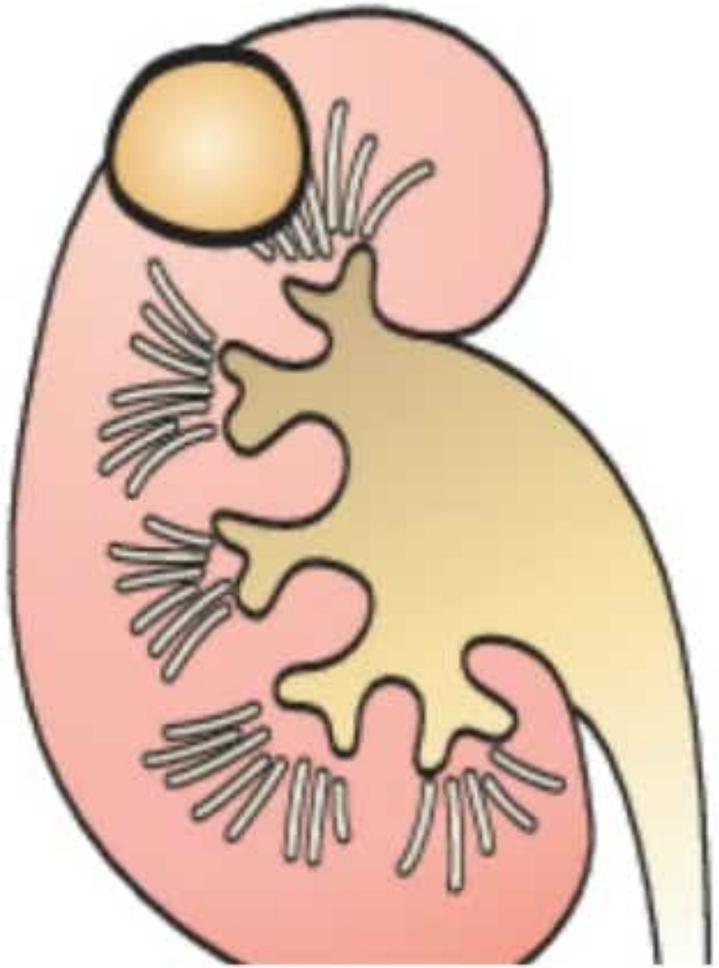
- **Microscopy:**
- Lining by flattened epithelium
- Wall composed by fibrocollagenous tissue











- Nephrocystin
- Fibrocystin
- Polycystin