

The pathology of the urinary tract

泌尿道病理

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Nephron 腎元

- Glomerulus 腎小球
- Renal tubule 腎小管

泌尿道主要疾病

- Developmental diseases 發育性疾病
- Immunologic disorders 免疫疾病
- Metabolic disorders 代謝疾病
- Circulatory disorders 循環疾病
- Bacterial infections 細菌感染
- Tumors 腫瘤

泌尿道疾病的症狀(1)

- Altered volume of urine 尿量改變
 - (1) Oliguria 少尿
 - (2) Polyuria 多尿
 - (3) Anuria 無尿
- Proteinuria 蛋白尿
- Hematuria 血尿

泌尿道疾病的症狀(2)

- Pyuria 膿尿
- Pain: urinary colic
- Dysuria 解尿疼痛
- Fever 發燒
- Uremia 尿毒症:
BUN (blood urea nitrogen), creatinine,
Water retention 水分累積,
Electrolyte imbalance 電解質不平衡
(hyperkalemia 高血鉀)

Developmental diseases

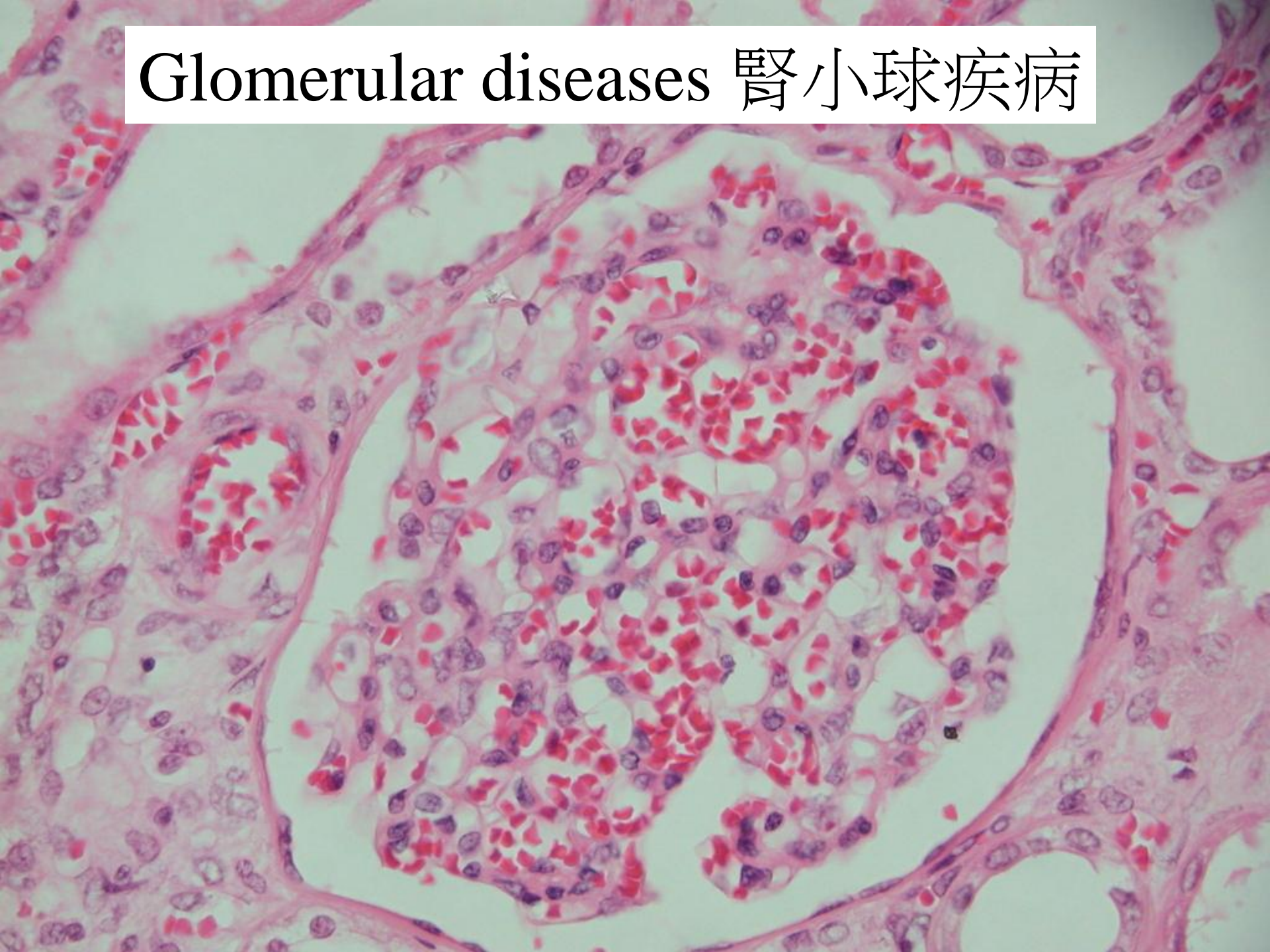
發育性疾病

- Renal agenesis 腎缺乏症—bilateral or unilateral
- Polycystic kidney disease 多囊性腎病

Autosomal dominant polycystic kidney disease 體染色體顯性遺傳多囊性腎病

- 1/1000
- Polycystin-1 gene突變
- 影響雙側腎臟
- Cystically dilated renal tubules
- Renal failure by the age of 40 and 50 years
- 40% associated with the following diseases
 - (1) Polycystic liver disease 多囊性肝病
 - (2) Cerebral artery aneurysm 腦動脈瘤
 - (3) Mitral valve prolapse 二尖瓣脫垂

Glomerular diseases 腎小球疾病



腎小球疾病的臨床表現

- Nephritic syndrome 腎炎症候群
- Nephrotic syndrome 腎病症候群
- Asymptomatic hematuria or proteinuria
無症狀血尿或蛋白尿
- Acute renal failure 急性腎臟衰竭
- Chronic renal failure 慢性腎臟衰竭

Nephritic syndrome 腎炎症候群

- Hematuria 血尿
- Mild to moderate proteinuria 蛋白尿
- Hypertension 高血壓
- Edema 水腫
- Azotemia 氮血症

Nephrotic syndrome 腎病症候群

- Proteinuria (protein loss in the urine > 3.5 gm per day)
- Edema 水腫
- Hypoalbuminemia 白蛋白過低
- Hyperlipidemia 高血脂
- Lipiduria 脂肪尿

腎小球疾病的病因

- Immunologic diseases 免疫疾病
- Metabolic diseases 代謝疾病
- Circulatory diseases 循環疾病

Immunologic glomerular diseases

- Deposition of immunoglobulin and activation of complement in the glomeruli

抗體沉積與補體活化

Poststreptococcus glomerulonephritis

鏈球菌感染後腎小球腎炎

- It occurs 1 to 2 weeks after an acute streptococcal upper respiratory or skin infection.
- Group A β -hemolytic streptococcus
- Caused by antibodies in response to certain streptococcal antigen.
- Entrapment of immune complex in glomeruli
- Activation of complement
- Attraction of neutrophils

鏈球菌感染後腎小球腎炎

- Children
- Nephritis syndrome
- Short-lived inflammation
- 大部分病人可以完全恢復

Crescentic glomerulonephritis

新月體腎小球腎炎

- Severe glomerular injury
- Crescent-shaped epithelial and inflammatory exudate in the urinary space
- Not a single disease
- Rapid progressive loss of renal function

新月體腎小球腎炎



Crescent

Ig A nephropathy

Ig A 腎病變

- Children and adolescents
- 最常見出現無症狀血尿的腎小球疾病
- Ig A deposition in the capillary wall and mesangium
- Symptoms appear several days after respiratory tract infection.
- 25-50% chronic renal failure

Minimal change disease 微小變化病

- 最常見小孩腎病症候群的原因
- Minimal histologic change
- 無抗體沈積
- Good response to steroid

Focal segmental glomerulosclerosis

局部性腎絲球硬化症

- One of the most common type of nephrotic syndrome in adults.
- **Focal**: Not all glomeruli are affected
- **Segmental**: partial scarring of glomeruli.
- Not a single disease
- Primary
- Secondary: HIV infection, intravenous drug abuse , and massive obesity etc
- Poor response to steroid

Membranous nephropathy

膜性腎病變

- The most common cause of nephrotic syndrome in adults
- 免疫複合體沈積使得腎小球微血管壁變厚
- Primary (idiopathic): 85%
- Secondary : tumor, drug, infection (HBV), SLE.
DM
- Worse response to steroid
- Chronic renal failure

Lupus nephritis 狼瘡腎炎

- 60-70% of SLE patients
- Proteinuria, hematuria, nephritis syndrome, nephrotic syndrome

Metabolic disorders: diabetic nephropathy 糖尿病腎病變

- 5-10% of DM patients
- Proteinuria or nephrotic syndrome
- Tubular atrophy
Pyelonephritis 腎盂腎炎
- Uremia

End-stage glomerulopathy

末期腎小球病變

- End stage of immunologic, metabolic, and circulatory glomerular diseases
- Common cause of chronic renal failure

Renal tubule disease

Acute tubular necrosis 急性腎小管壞死

- A sudden decrease in arterial pressure (hypotension)
- The proximal tubules are most affected.
- Reversible changes
- Toxin or drug

Analgesic nephropathy

止痛藥腎病變

- Long-term use of multiple analgesics
- Unknown mechanisms
- Hypertension, anemia, chronic renal failure
- Associated with transitional cell carcinoma

Urinary tract infection (UTI)

泌尿道感染

- Bacterial infection is the most common cause of UTI.
- Acute pyelonephritis 腎盂腎炎
- Cystitis 膀胱炎
 - Honeymoon cystitis
- Urethritis 尿道炎
- Hematogenous infection
- Ascending infection

泌尿道感染

- Female
- Urinary bladder catheterization
- Obstruction: stones
benign prostatic hyperplasia,
neurogenic
bladder
- Vesicoureteral reflux 輸尿管
膀胱逆流
- Diabetes mellitus 糖尿病
- Pregnancy
- Surgery

泌尿道感染

- E coli : the most common
- Fever, flank pain, dysuria, pyuria, frequency

Urinary stones 泌尿道結石

- 5% of adults Male>female
- Calcium Oxalate 草酸鈣 or calcium phosphate 磷酸鈣: 75%
- Familial history
- Struvite stones:
 - (1) Magnesium ammonium phosphate or sulfate
 - (2) 15% of renal stone
 - (3) Urinary tract infection
- Uric acid 尿酸: hyperuricemia, gout
- Hematuria, colic pain 絞痛, infection

Neoplasms of urinary tract

泌尿道腫瘤

- Tumors are more often malignant than benign.
- Tumors originate from
 - (1) Epithelial cells of the kidney
 - (2) The urothelium (transitional cell lining of the pelvis, ureter, urinary bladder, and posterior urethra).

- Renal cell carcinoma
腎細胞癌
- Transitional cell
carcinoma 移行細胞
癌:
Renal pelvis, ureter,
urinary bladder, and
urethra

Renal cell carcinoma 腎細胞癌

- The most common kidney neoplasm
- Adults, median age: 55 years; Male>female
- 原因
 - (1) Hereditary disease: von Hippel-Lindau syndrome:
 - (a) Cerebellar hemangioblastoma, retinal angioma
 - (b) VHL gene
 - (2) Smoking
 - (3) Cystic diseases

Renal cell carcinoma 腎細胞癌

- Flank pain, hematuria, palpable mass
- Hypercalcemia
- Erythrocytosis: erythropoietin 紅血球生成素
- Surgery
- 5-year survival rate: 40%
- Distant metastasis: lung and bone

Transitional cell carcinoma (Urothelial carcinoma)

移行細胞癌

- Urinary bladder: the most common site
- 60-80 years
- Male > female
- Risk factors: smoking, chemicals, drugs
- Painless hematuria, obstruction

Transitional cell carcinoma

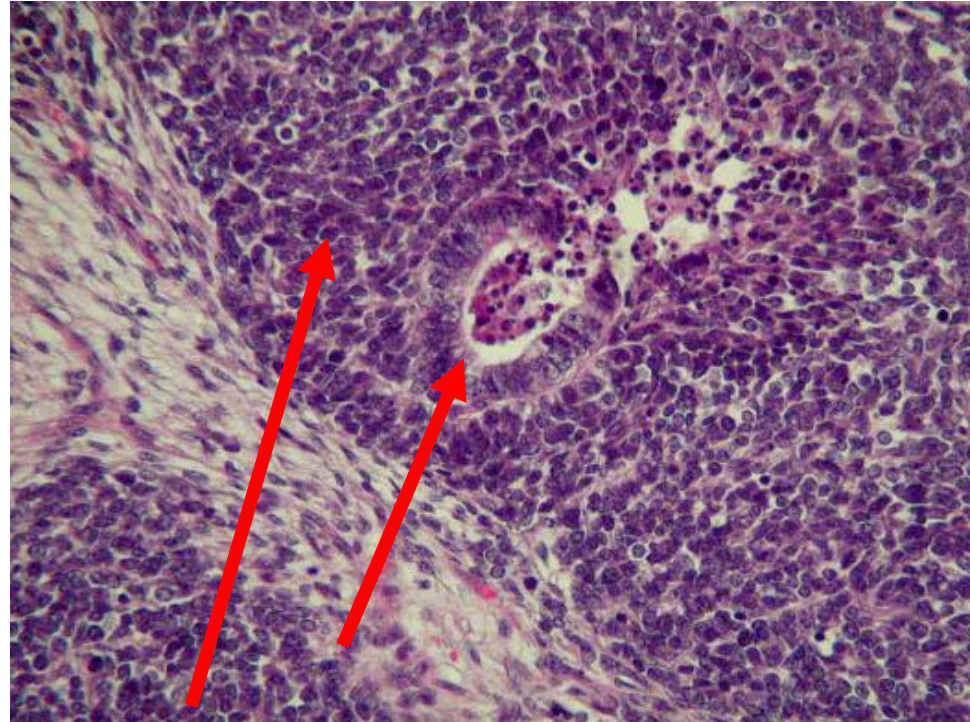
移行細胞癌

- Multifocal
- The prognosis is better than that of RCC.
- The prognosis is related with grading and invasive depth
- Surgery, chemotherapy, immunotherapy

Wilms' tumor (nephroblastoma)

腎母細胞瘤

- The most common malignant renal tumor in children.
- Wilms' tumor gene :
WT-1 and WT-2
- Palpable mass
- Solitary or multiple
- Surgery and chemotherapy
- 85% cure rate



Normal anatomy and physiology of the male reproductive system

男性生殖器官

- Testis 睪丸
- Epididymis 副睪
- Vas deferens 輸精管
- Seminal vesicles 儲精囊
- Prostate 前列腺
- Penis 陰莖

Cryptorchidism 隱睪症

- A congenital malpositioning of the testes outside of their normal scrotal location.
- In most boys, the inguinal canal closes before 1 years.
- Unknown causes
- Testicular atrophy by 5-6 years
- Infertility and malignancy

Varicocele 精索靜脈區張

- Dilatation of internal spermatic vein and venous plexuses
- Left > right
- Asymptomatic, pain, or heaviness of the scrotum
- Infertility

Infection

- Balanitis: 龜頭炎
 - poor local hygiene, herpes, syphilis
- Urethritis: 尿道炎
- Prostatitis 前列腺炎
- Epididymitis 副睪炎
 - (1) Ascending infection
 - (2) Hematogenous: TB
- Orchitis 睪丸炎
 - (1) Ascending infection
 - (2) Hematogenous: mumps

Sexually transmitted diseases (STD)

Genital herpes 疱疹

- Herpes simplex virus type II
- Painful vesicles and ulcers
- Tends to recur

Gonorrhoea 淋病

- *Neisseria gonorrhoeae*
- Purulent urethritis, burning on urination, a yellow discharge.
- The symptoms appear 2-5 days after exposure.
- Prostatitis and epididymitis
- Narrowing of the urethra and obliterating he epididymis.
- Pain during urination and infertility
- Gonococcal arthritis

Non-gonococcal urethritis

非淋病尿道炎

- Chlamydia, Mycoplasma hominis, or ureaplasma urealyticum
- The most common STD
- Symptoms similar to those of gonococcus.
- Prostatitis and epididymitis

Syphilis梅毒

- Spirochete: *Treponema pallidum*
- Three stages
- 初期梅毒-chancres 下疳
 - (1) Painless ulcer at the entry sites of the microorganisms.
 - (2) 1 to 12 weeks after infection.
- Chancres heal spontaneously in 4 to 6 weeks.

Secondary stage of syphilis

第二期梅毒

- Manifestation of systemic spread of spirochetes.
- 2 months to 2 years after the primary infection
- Fever, malaise, generalized lymphadenopathy
- Skin: Maculopapular, scaly, or pustular skin lesions
- Soles and palms
- Condyloma lata 扁平濕疣 : a slightly elevated papule
- Highly infectious
- Resolves over several weeks

Tertiary stage of syphilis

第三期梅毒

- 2 to 20 years after infection
- Syphilitic granuloma: gumma 梅毒腫
- *Cardiovascular syphilis*
 - 梅毒主動脈炎
 - 主動脈瘤
- *Neurosyphilis*
 - Tabes dorsalis* 脊髓癆 : Destruction of posterior column of the spinal cord
 - General paresis* 麻痺性癡呆 : paralysis and dementia

Human papilloma virus

人類乳突瘤病毒

- Condyloma acuminatum
尖性濕疣
- type 6 and 11.

Tumors of the testis 睪丸腫瘤

- These are rare tumors but important because 90% of tumors affect men 25 to 45 years of age.
- Most tumors in these ages are of germ cell origin.
- Most tumors are malignant.
- Metastasis to pelvic lymph nodes
- Metastasis to liver, lungs, and brain.
- A testicular tumor in older men: disseminated lymphoma or metastatic malignancy

睪丸腫瘤

- Cryptorchidism is the most important predisposing condition.
- Abnormally developed testes (Klinefelter syndrome)

Germ cell tumor of the testis

- Seminoma 精細胞瘤
- Nonseminomatous germ cell tumors
 - (1) Embryonal carcinoma 胚胎癌
 - (2) Yolk sac tumor 卵黃囊瘤
 - (3) Choriocarcinoma 絨毛癌
 - (4) Teratoma 畸胎瘤
- Mixed germ cell tumor

Seminoma 精細胞瘤

- Peak incidence: 40 years
- Painless mass in the testis
- No serologic marker
- Radiosensitive
- Good prognosis

Non-seminoma germ cell tumor

- Choriocarcinoma-human chorionic gonadotropin
- Pure yolk sac tumor-alpha-fetoprotein
- Embryonal carcinoma
- NSGCT: younger than seminoma (30 years)
- Poorer prognosis than seminoma

Benign prostatic hyperplasia (BPH)

良性前列腺增生

- A reactive enlargement of the periurethral portion of the prostate.
- Testosterone plays a crucial role.
- Estrogen

BPH

- Frequency 頻尿
- Urgency
- Nocturia 夜尿
- Difficulty in urination 解尿困難
- Infection
- Chronic renal failure

Carcinoma of the prostate 前列腺癌

- The most common cancer in males
- A tumor of older men
- Testosterone, genetic, races
- Usually in the peripheral glands
- Metastasis to lymph nodes, bones, lungs, and liver

Carcinoma of the prostate 前列腺癌

- Adenocarcinoma
- Histologic grading of the tumor is clinically important. (Gleason grading)
- The histologic grade closely correlates with the extent of tumor spread.
- Prostate-specific antigen (PSA)
- Usually asymptomatic