Urology Training Curriculum

Overview and objectives of the Urology Curriculum

Trainees who have completed basic surgical training, passed the Membership Examination and selected by the Central Selection Exercise for higher surgical training in urology will undergo at least four years of higher urology training in centres accredited jointly by the College of Surgeons of Hong Kong and the Royal College of Surgeons of Edinburgh. The purpose of the curriculum is to train urologists who will be able to work independently to the standard of a Specialist in Urology. Most of the skills to be acquired relate to the management of common general elective and emergency urology and this forms the basis of the main part of the curriculum, with the competences, both non-operative and operative being completed by the final year of training.

Topics

[1] Basic science

Anatomy
Knowledge
Gross and microscopic anatomy of the urinary tract
Vascular anatomy of the urinary tract
Neurological supply of the urinary tract, pathways of pain.
Embryological development in relation to disorders affecting the urinary tract

Physiology
Knowledge
Endocrine homeostasis
Control of blood pressure
Mechanism of urine production
Mechanism of peristalsis
Mechanism of neuromuscular transmission
Antireflux mechanism
Neurophysiological control of filling and voiding cycles.
Physiological properties of bladder muscle and mucosa.
Neurophysiology of sphincter mechanism in male and female.
Physiology and molecular biology of prostate cell
Physiology of prostate secretion
Prostate specific antigen and related markers
Physiology of erection and ejaculation
Urological endocrinology
Mechanism of spermatogenesis and mechanism of spermatic transport
Function of accessory genital organs.
Effect of disease and drugs on normal genital function
Physiology of pain.
Pathways of pain

**Pharmacology**

**Knowledge**
Mechanism of action of commonly used drugs in urology
Nephro-pharmacology
Cholinergic and Adrenergic mechanisms
Non-adrenergic, non-cholinergic (NANC) mechanisms
Pharmacology of coagulation
Pharmacology of inflammation
Pharmacology of neoplastic disease.

**Pathology**

**Knowledge**
Basic genetics of uropathological conditions
Common congenital disorders affecting the urinary tract
Changes related to congenital abnormalities
Basic principles of microbiology, resistance, cross infection relevant to the GU tract
Infection control and sterilization
Antibiotics including mechanism of action
Acute and chronic inflammatory response
Chronic inflammatory mechanisms and diseases
Role of genetics and environmental factors in urological cancer
Mechanism of tumour initiation and growth
TNM classification of common urological tumours
Oncogenes, growth factors and angiogenesis
Mechanism of chemotherapy, immunotherapy and radiotherapy
Familial prostate cancer and renal oncology
Abnormalities resulting from trauma
Primary and secondary wound healing by anatomical site.

[2] Clinical pharmacology

Knowledge
Clinical pharmacology of commonly used drugs including side effects and contraindications of drugs for the following conditions:
Acute and chronic infection
Lower urinary tract dysfunction
Erectile dysfunction
Urinary incontinence
Systemic chemotherapy for urological malignancy
Intravesical chemotherapy for urological malignancy
Anticoagulants
Analgesics and postoperative pain relief
Immunosuppressants
DVT prophylaxis in urological surgery
Side effect upon genitourinary tract of drugs used to treat common conditions.

Clinical skills
Appropriate use of commonly used drugs recognizing common side effects, interaction and contraindications


Knowledge
principles of management of stones in the urinary tract
mechanism of stone formation
natural history and pathophysiology of stones
symptom complexes according to site
complications of stone
metabolic management of stone disease
mechanism of ureteric colic
renal adaptation to ureteric obstruction
microbiology of sepsis of urinary tract
acute and chronic inflammatory response related to stones.
role of IVU/US and CT in diagnosis
principles of isotope and isotope imaging.
pharmacology of drugs for ureteric colic
pharmacology of drugs for metabolic stone disease
pharmacology of drugs for sepsis of urinary tract
pharmacology of pain prevention and relief
Local anaesthetics
Mechanism of extracorporeal lithotripsy
Mechanism of intracorporeal lithotripsy
Complication of treatment for stones
Results of stone treatment in different locations
Percutaneous access
Range and choice of ureteroscopes
Open operation for renal stone.
Role of stents
Post treatment care

Clinical skills
management of renal stone
management of ureteric stone
management of bladder stone
requirement for emergency therapy
appropriate multidisciplinary assessment and management
investigation and management of patients with recurrent stone disease.
Assessment of obstruction/ sepsis
Selection of appropriate isotope investigations and interpretation of renogram
Assessment of the anuric patient, patient in renal failure
Medical management of stones.

Procedures
Methods of drainage: JJ stent and PCN insertion
ESWL
Rigid ureteroscopy
PCNL
Flexible URS with intracorporeal lithotripsy
Cystoscopic lithotripsy
Open cystolithotomy.

[4] Urinary tract obstruction
Include topics on benign upper tract disease, including pelviureteric junction
obstruction, ureteric stricture

**Knowledge**

- Mechanism of peristalsis initiation in urinary tract
- Mechanism of neuromuscular transmission
- Anatomy, etiology and pathophysiology of upper urinary tract obstruction
- Etiology, pathophysiology and management of ureteric stricture
- Operative approaches, indications and complications of surgical treatment of ureteric stricture including ureteroscopic, laparoscopic and open
- Principles of Isotopes and isotope imaging
- Pharmacology of pain prevention and relief
- Endoscopic management of upper tract obstruction
- Etiology, pathophysiology and clinical features of pelviureteric junction obstruction
- Investigation and management of pelviureteric junction obstruction
- Operative approaches, indications and complications of surgical treatment of pelviureteric junction obstruction including percutaneous, ureteroscopic, laparoscopic and open
- Investigation and treatment options for lower urinary tract symptoms
- Causes and pathophysiology of urinary retention in men and women.
- Mechanism of acute/chronic retention of urine.
- Etiology, pathophysiology and management of urethral stricture
- Etiology, pathophysiology and management of bladder neck stenosis
- Epidemiology of BPH
- Natural history and complications of BPH
- Urodynamic basis for symptoms of BPH
- Non-urological causes of LUTS
- Utility of PSA
- Detail medical and surgical therapy for BPH

**Clinical skills**

- Assessment of unilateral and bilateral renal obstruction
- Recognition and early management of sepsis
- Management of upper urinary tract obstruction
- Selection of imaging investigations for upper tract disorder
- Selection of appropriate isotope investigation
- Interpretation of IVU and diuresis renography
Management of postobstructive diuresis
Assessment of renal function and fluid balance.
Management of patient with Pelviureteric junction obstruction
Selection of treatment options and surgical approaches for pelviureteric junction obstruction.
Counsel and obtain informed consent for operation on pelviureteric junction obstruction
Management of patient with ureteric stricture.
Selection of treatment options and surgical approaches for ureteric stricture
Counsel and obtain informed consent for operation on ureteric stricture
Interpretation of urinary flow rates
Clinical assessment and differential diagnosis of men and women with LUTS
Therapeutic plan for men and women with LUTS
Management of urethral stricture
Management of bladder neck stenosis
Interpretation of fluid, frequency voiding charts
Interpretation of biochemistry and PSA in LUTS
Interpretation of flow rate, residual urine and urodynamic investigations in male LUTS
Medical therapy of BPH/ LUTS in men.

**Procedures**
Cystoscopy and retrograde pyelogram, insertion of JJ stent, PCN
Urodynamic test
TURP
Bladder neck incision
Suprapubic catheter insertion
Urethrography
Optical urethrotomy.
Urethral stents.
Percutaneous access to kidney
Retroperitoneal access
Assistance in open, laparoscopic pyeloplasty, and percutaneous and URS treatment of PJJ obstruction
Ureteroscopic treatment of ureteric stricture.
Extra-anatomical stent insertion
Open surgical procedures for correction of ureteric stricture.
Lap/ open simple nephrectomy
[5] Urinary tract infection

Knowledge
Biological mechanisms of upper and lower urinary tract infection – virulence
Host defence
Antibiotics and mechanisms of action
Microbiological tests
Predisposing causes of pyelonephritis
Clinical presentation and management of pyelonephritis.
Pathogenesis and predisposing causes of renal and peri-renal abscess
Clinical presentation and management of renal and peri-renal abscess
Pathogenesis, natural history and complication of genitourinary tuberculosis
Clinical presentation and management of genitourinary tuberculosis
Classification, pathogenesis, natural history and complications of prostatitis
Diagnosis and management of prostatitis
Role of segmented culture in prostatitis
Pathogenesis, natural history and complication of epididymitis
Clinical presentation and differential diagnosis of epididymitis
Treatment of epididymitis
Classification of scrotal abscess
Pathogenesis, natural history and complications of scrotal abscess
Diagnosis and management of scrotal abscess
Pathophysiology and clinical features of Fournier’s gangrene
Pathogenesis, natural history and complications of sexually transmitted diseases
Clinical presentation, differential diagnosis and management of sexually transmitted diseases
Pathogenesis, natural history and complications of retroperitoneal fibrosis
Clinical presentation and management of retroperitoneal fibrosis.
Pathogenesis, natural history and complications of interstitial cystitis
NIH criteria for diagnosis of interstitial cystitis
Clinical presentation and management of interstitial cystitis
Role of urodynamics, imaging, endoscopy and other investigations for interstitial cystitis
Conservative treatment for interstitial cystitis.
Indications, results and complications of surgical treatment for interstitial cystitis.

Clinical skills
Identification and management of significant infection and asymptomatic bacteriuria.
Selection of appropriate antibiotics
Management of infection in specific patient groups: children, adult female, pregnancy
Collection of specimens and interpretation of results.
Assessment, diagnostic and microbiological workup for pyelonephritis
Indications for nephrostomy/drainage of kidney
Assessment, diagnostic and microbiological workup for renal and peri-renal abscess
Treatment for renal and peri-renal abscess
Assessment, diagnostic and microbiological workup for genitourinary tuberculosis
Assessment, diagnostic and microbiological workup for prostatitis
Medical management of prostatitis
Assessment, diagnostic and microbiological workup for epididymitis
Medical management of epididymitis.
Assessment, diagnostic and microbiological workup for scrotal abscess
Management of Fournier’s gangrene, multidisciplinary approach
Assessment, diagnostic and microbiological workup for sexually transmitted disease
Assessment and diagnostic workup for retroperitoneal fibrosis
Medical management of retroperitoneal fibrosis.
Assessment and diagnostic workup for interstitial cystitis
Medical management of interstitial cystitis, MDT approach
Further management of patient with resistant painful bladder syndrome

**Procedures**
Cystoscopy and retrograde ureterogram, JJ stent insertion, PCN
Surgical treatment of scrotal abscess
Cystoscopic assessment of the painful bladder
Augmentation and substitution cystoplasty
Simple cystectomy and ileal conduit diversion.
Continent urine diversion

**[6] urinary incontinence**

**Knowledge**
Etiology, epidemiology, pathophysiology and classification of incontinence in men and women
Clinical presentation and differential diagnosis of urinary incontinence
Management of urinary incontinence
Etiology, epidemiology, pathophysiology and classification of neuropathic bladder
Management of neuropathic incontinence
Incontinence in elderly
Investigation, diagnosis and management of urgency and urge incontinence.
Role of urodynamics, imaging, endoscopic and other investigations for urgency and urge incontinence.
Conservative management techniques for urgency and urge incontinence
Indications, results and complications of surgical treatment for urgency and urge incontinence
Investigation, diagnosis and management of stress incontinence.
Role of urodynamics, imaging, endoscopic and other investigations for stress incontinence.
Conservative management techniques for stress incontinence
Indications, results and complications of surgical treatment for stress incontinence

Clinical skills
Clinical assessment of urinary incontinence
Interpretation of frequency volume chart
Multidisciplinary approach to incontinence
Medical treatment of incontinence
Clinical assessment of neuropathic bladder
Investigation of neuropathic bladder
Multidisciplinary approach to neuropathic bladder
Medical treatment for neuropathic bladder.
Clinical assessment and management of incontinence in the elderly
Clinical assessment of urgency and urge incontinence according to ICS standard
Counsel patient on therapeutic options for treatment of urgency and urge incontinence.
Further management of patient with resistant overactive bladder
Clinical assessment of stress and mixed incontinence according to ICS standard
Conservative treatment for stress incontinence
Selection of appropriate surgical treatment for stress incontinence
Counsel patient on therapeutic options for treatment of stress incontinence.

Procedures
Urodynamic studies
Cystoscopic injection of botulinum toxin
Cystoscopic injection of urethral bulking agent
Surgical insertion of mid urethral tape
Detrusor myomectomy
Augmentation and substitution cystoplasty
Sacral neuromodulation

[6a] Female urology: topics (female incontinence), (painful bladder syndrome),
female urinary retention, prolapse, urinary fistula, urethral diverticulum, trauma

Knowledge
Abdominal and pelvic anatomy, with emphasis on bony pelvis, pelvic viscera, pelvic
floor and side walls and the endopelvic fascial
Embryology of the genitourinary tract
Neuroanatomy in relation to bladder, urethral and pelvic floor function
Physiology and neurophysiology of the micturition and continence
Physiology of bladder function
Physiology of female reproduction and female hormonal function
Physiology of female sexuality
Pharmacology of cholinergic, adrenergic and other neurotransmitter system
Pharmacology of drugs used in management of lower urinary tract dysfunction.
Pharmacology of drugs for other systems that would affect urinary tract
Hormonal replacement in postmenopausal women.
Pharmacology of drugs for treatment of anorectal dysfunction and constipation.
Pathophysiology of urinary incontinence in women
Pathophysiology of pelvic organ prolapse in women
Indications, techniques, complications and results of non-surgical and surgical therapy
for pelvic organ prolapse.
Pathology of ageing effects on pelvic organs and urinary tract
Pathophysiology of interstitial cystitis and other painful bladder syndrome
Pathophysiology of UTI in women.
Underlying causes and mechanism of urinary retention in women.
Causes, pathophysiology, presentation and complication of urinary fistulae
Diagnosis and management of urinary fistula
Indications, results and complications of surgical treatment of urinary fistula.
Causes, pathophysiology, presentation and complications of urethral diverticulum
Diagnosis and management of urethral diverticulum
Indications, complications and results of surgical treatment of urethral diverticulum
Pathophysiology of traumatic and radiation damage to the genitourinary tract
Diagnosis and management of traumatic and radiation damage to the genitourinary tract
Graft, flaps and bowel in reconstruction for traumatic and irradiation damage to the
genitourinary tract
Pelvic floor electromyography, nerve conduction studies.

**Clinical skills**
Assessment of lower urinary tract dysfunction in women integrated with bowel, sexual and reproductive issues.
Appropriate use of commonly used drugs with knowledge of side effects, interactions and contraindications.
Investigation and management of women with urinary retention.
Assessment of pelvic organ prolapse
Selection of conservative treatment, pessary or surgical treatment for prolapse, with MDT
Assessment of patient with urinary fistula
Selection and timing of surgical treatment for urinary fistula
Assessment of urethral diverticulum
Advice on surgical treatment for urethral diverticulum
Assessment of women with traumatic and radiation damage to the urinary tract
Advice on surgical treatment for traumatic and radiation damage to the urinary tract.
Assessment of bowel dysfunction in women with lower urinary tract dysfunction
Advice on dietary regimes, bowel medications and enema.

**Procedures**
Urodynamics study
Pad test
Pessary fitting
Anterior repair
Paravaginal repair, vaginal obturator shelf repair
Sacrocolpexy
Vaginal hysterectomy
Vesicovaginal fistula repair
Martius flap
Urethrovaginal fistula repair
Ureterovaginal fistula repair
Simple cystectomy and ileal conduit
Continent urinary diversion
Surgical excision of urethral diverticulum
Vaginal reconstruction
[6b] Reconstruction in urinary tract

Knowledge
Abdomino-pelvic anatomy
Neuroanatomy relating to bladder, urethral and pelvic floor functions
Anatomy and vascular supply of the gastrointestinal tract
Physiology of gastrointestinal function
Causes and Pathophysiology of conditions that might require reconstruction of the bladder and ureter, including: congenital and acquired neurogenic conditions, congenital abnormalities of the urinary tract, genitourinary tumours, iatrogenic damage or trauma, inflammatory disorders.
Techniques for assessment of patients for reconstruction including urodynamics, radiological and nuclear imaging
Metabolic effects of urinary tract reconstruction and interposition of intestine within the urinary tract
Complications of urinary tract reconstruction and interposition of intestine within the urinary tract
Endourological techniques relevant to urinary reconstruction
Surgical techniques in reconstruction of the bladder and ureter
Anatomy of the male genitalia and urethra
Embryology of urethral, hypospadias and epispadias
Physiology of erection and ejaculation
Causes and pathophysiology of urethral strictures
Pathophysiology of traumatic urethral injury
Techniques and complications of urethral reconstruction
Endourological techniques of urethral reconstruction
Surgical techniques of urethral reconstruction

Clinical skills
Assessment of patients with upper and lower urinary tract dysfunction who require urinary tract reconstruction
Advice on non-surgical and surgical options for conditions requiring reconstruction
Indication and selection of surgical management for patient
Appropriate choice of reconstructive technique
Management of postoperative consequence of urinary tract reconstruction and interposition of intestine within the urinary tract.
Appropriate follow up of patients with urinary tract reconstruction and interposition of intestine within the urinary tract
Assessment of men with urethral strictures
Assessment of patient requiring urethral reconstruction
Management of postoperative consequences of urethral reconstruction
Appropriate follow up of patients with urethral reconstruction
Appropriate choice of surgical options for urethral stricture.

**Procedures**
- Urodynamics studies
- Intestinal anastomosis and mobilization of omentum
- Ureteric anastomosis
- Ureteric reimplantation
- Psoas hitch and Boari flap
- Transuretero-ureterectomy
- Augmentation cystoplasty
- Substitution cystoplasty
- Simple cystectomy and ileal conduit diversion
- Continent urinary diversion
- Orthotopic bladder reconstruction
- Artificial sphincter insertion
- Vaginal reconstruction
- Optical urethrotomy
- Harvesting of buccal mucosal graft
- Bulbar anastomotic urethroplasty
- Single stage substitution urethroplasty with flaps and grafts
- Two stage buccal graft urethroplasty
- Urethral reconstruction for pelvic fracture.

[6c] **Neurourology**

**Knowledge**
- Neuroanatomy of the peripheral and central nervous system related to normal and abnormal bladder and genital function
- Physiology and neurophysiology of micturition and continence
- Physiology of bladder mucosa and musculature.
- Physiology and neurophysiology of sexual and reproductive function in men and women.
- Pharmacology of the genitourinary organs including cholinergic, adrenergic and other neurotransmitter systems.
- Pharmacology of drugs used in the management of lower urinary tract dysfunction
- Pharmacology of drugs used in the management of disease of central nervous system
(eg Parkinson’s disease, neuropathic pain)
Pharmacology of agents used for treatment of constipation and alteration of bowel activities.
Pathophysiology of neurogenic bladder dysfunction in congenital and acquired diseases of the central and peripheral nervous system
Effects of neurogenic bladder dysfunction upon renal function
Pathophysiology of sexual dysfunction in congenital and acquired diseases of the central and peripheral nervous system
Pathophysiology of traumatic spinal cord injury, including effects upon function of the genitourinary tract
Effects of neurological disease upon mobility, manual dexterity, vision and other bodily functions relevant to the management of bladder dysfunction.
Pathophysiology of autonomic dysreflexia
Investigations and management of patients with neurogenic bladder or sexual dysfunction
Complications of neurogenic bladder dysfunction including renal impairment, urosepsis, and calculus formation.
Role of urodynamics, imaging, endoscopic and other investigations for neurogenic bladder
Conservative management techniques for neurogenic bladder
Surgical treatment for neurogenic bladder dysfunction
Indications, complications and results of surgical techniques for neurogenic bladder

**Clinical skills**
Assessment of patients with neurological disease and bladder or sexual dysfunction
Indication, common side effects, interactions and contraindications to commonly used drugs for lower urinary tract dysfunction
Clinical assessment of neurogenic bladder according to ICS standards
Plan investigation and treatment for neurogenic bladder dysfunction with MDT
Plan conservative management for bladder dysfunction and sexual dysfunction.
Selection of management of neurogenic bladder dysfunction
Counsel patient and obtain informed consent for various therapeutic options for neurogenic bladder dysfunction.

**Procedures**
Urodynamics study and video urodynamics study
Cystoscopic injection of botulinum toxin
Suprapubic catheter insertion
Exteranl sphincterotomy
Augmentation cystoplasty
Substitution cystoplasty
Continent diversion
Insertion of artificial sphincter
Insertion of spinal simulator
Neuromodulation

[7] Urological oncology, General
Knowledge
Epidemiology of common urological cancer
Genetic and environmental factors in oncogenesis
Molecular biology of urological cancer
Oncogenes, growth factors and angiogenetic factors in relation to cancer
TNM classification of common urological cancers
Neoadjuvant versus adjuvant therapy
Principles and application of radiotherapy

Clinical skills
Terminal care
Principles of screening
PSA as screening tool and controversy
Urine cytology screening and controversy
Multidisciplinary care

Procedure
TURBT
Ureteroscopy

[7a] Prostate cancer
Knowledge
Embryology and anatomy of the prostate, bladder and sphincters
Lymphatic drainage of the pelvic organs
Physiology of the prostate
Physiology of erection
Physiology of micturition
Pharmacology of endocrine drugs used in prostate cancer
Pharmacology of cytotoxic drugs used in prostate cancer
Pharmacology of other agents used in prostate cancer
Genetics of prostate cancer
Environmental factors for prostate cancer
Current theories of tumour initiation and growth.
Role of oncogene and growth factor in pathogenesis of prostate cancer
Theory and technique of radiological and nuclear imaging for prostate cancer
Theory and technique of radiotherapy for prostate cancer
Rationale, indications, complications of radical surgery for prostate cancer
Rationale, indications, complications of radical external beam radiotherapy for prostate cancer
Rationale, indications, complications of brachytherapy for prostate cancer
Rationale and indications of active surveillance
Rationale, indications, complications of adjuvant and neoadjuvant hormonal therapy
Role and limitation of new technologies in prostate cancer (cryotherapy, HIFU)
Rationale, indications, complications of hormone therapy for metastatic prostate cancer
Rationale, indications, complications of chemotherapy for metastatic prostate cancer
Rationale, indications, complications of radiotherapy for metastatic prostate cancer
Rationale, indications, complications of novel therapy for metastatic prostate cancer
Definition and prognosis of hormone refractory prostate cancer
Biology of bone metastasis and drug management.
Pharmacology of drugs for bone metastasis

Clinical skills
Assessment of patients with locally confined prostate cancer
Assessment of patient with locally advanced prostate cancer
Assessment of patient with metastatic prostate cancer
Assessment of patient with hormone refractory prostate cancer
Interpretation of stage, grade and molecular markers
Selection of relevant pathological and radiological investigations
Formulation of management plan with a MDT
Counsel and obtaining informed consent for treatment procedures.
Palliative management of metastatic prostate cancer patients.
Indications of likely response, duration of response and survival in patients with metastatic disease
Formulation of follow up plan

Procedures
Assist in radical prostatectomy (open, laparoscopic conventional/robot assisted)
Brachytherapy

[7b] Bladder cancer
Knowledge
Embryology and anatomy of the bladder
Lymphatic drainage of the pelvic organs.
Physiology of micturition
Pharmacology of intravesical chemotherapy
Pharmacology of intravesical immunotherapy
Pharmacology of cytotoxic drugs for urothelial cancer
Pathology of different types of bladder cancer
Role of genetics, oncogenes and growth factor in bladder cancer
Role of environmental factors in bladder cancer
Current theories of bladder cancer initiation and growth.
Evolution of system of staging and grading of bladder cancer
Theory and technique of nuclear imaging in bladder cancer
Theory and technique of radiotherapy for bladder cancer.
Rationale, indication, complications and results of TURBT
Rationale, indication, complications and results of intravesical chemotherapy
Rationale, indication, complications and results of intravesical BCG
Rationale, indication, complications and results of radical cystectomy
Rationale, indication, complications and results of radical radiotherapy
Rationale, indication, complications and results of palliative radiotherapy
Rationale, indication, complications and results of systemic chemotherapy
Rationale, indication, complications and results of reconstructive surgery following cystectomy
Role and limitation of new technology in diagnosis and therapy of bladder cancer
Relevance of co-morbidities in the choice of therapy for bladder cancer

Clinical skills
Assessment of patients with superficial bladder cancer
Assessment of patients with muscle invasive bladder cancer
Assessment of patients with metastatic bladder cancer
Indication of relevant radiological and pathological investigations
Formulation of management plan with MDT
Palliative care of patient with metastatic bladder cancer.
Counsel and obtaining informed consent for treatment procedures
Counsel and obtaining informed consent for diversion after cystectomy
Formulation of a relevant follow up plan

**Procedures**
- Cystoscopy biopsy
- TURBT
- Radical cystectoprostatectomy, cystourehrectomy
- Urethrectomy
- Ileal conduit diversion
- Orthotopic bladder reconstruction
- Continent urinary diversion

[7c] Renal cancer

Knowledge
- Embryology and anatomy of the upper urinary tract
- Pharmacology of agents used for systemic therapy in renal cancer
- Pharmacology of immunological agents for renal cancer
- Pathology of different types of renal cancer and other renal tumours
- Role of genetics in renal cancer and upper tract TCC
- Role of oncogenes and growth factors in renal cancer and upper tract TCC
- Role of environmental factors in renal cancer and upper tract TCC
- Current theories of tumour initiation and growth for renal cancer and upper tract TCC
- Current and previous staging and grading systems for renal cancer and upper tract TCC
- Immune response and its relevance to therapy of renal cancer and upper tract TCC
- Theory and technique of radiological and nuclear imaging for renal cancer and upper tract TCC

Rationale, indications, complications and results of radical nephrectomy for renal cancer
- Rationale, indications, complications and results of nephron sparing surgery
- Rationale, indications, complications and results of minimally invasive therapies
- Rationale, indications, complications and results of new technology in the diagnosis and therapy of renal cancer

Role and limitations of surgery, biological agents, immunotherapy, hormone therapy and novel therapy for metastatic renal cancer
- Rationale, indications, complications and results of radical surgery and endoscopic
surgery for upper tract TCC
Rationale, indications, complications and results of new technologies in the diagnosis and therapy of upper tract TCC
Relevance of co-morbidities in the choice of therapy

Clinical skills
Assessment of patient with renal cancer and upper tract TCC with appropriate use of stage, grade, molecular markers and imaging
Indication of relevant radiological and pathological investigations
Appropriate use of drugs, immunological agents and biological agents in renal cancer
Formulation of management plan with MDT
Selection of appropriate therapeutic approach for treatment of renal cancer and upper tract TCC
Counsel and obtaining informed consent for treatment procedures
Formulation of follow up plan

Procedures
Radical nephrectomy
Partial nephrectomy
Laparoscopic nephrectomy
Laparoscopic partial nephrectomy
Radical nephroureterectomy
Segmental ureterectomy and reconstruction
Laparoscopic nephroureterectomy
Ureteroscopic therapy of TCC

[7d] Penile cancer
Knowledge
Embryology and anatomy of the male genitalia including lymphatic drainage
Anatomy of the femoral triangle and upper thigh
Pharmacology of agents used for chemotherapy in penile cancer
Pathology of the differing types of penile cancer and premalignant conditions
Role of genetics, oncogene and growth factors in penile cancer
Role of environmental factors in penile cancer
Current previous staging and grading system for penile cancer
Theory and technique of radiological and nuclear imaging for penile cancer
Theory and technique of radiotherapy for penile cancer
Rationale, indications, complications and results of surgery and radiotherapy for
penile cancer
Rationale, indications, complications and results of surgery, radiotherapy and chemotherapy for lymphatic involvement in penile cancer.
Role and limitations of new technologies in diagnosis and therapy of penile cancer. Understanding the relevance of co-morbidity in the choice of therapy.
Rationale, indications, complications and results of different therapies for metastatic penile cancer.

Clinical skills
Selection of imaging for penile cancer
Assessment of penile cancer with stage, grade and molecular markers
Assessment of patient with possible lymphatic involvement including radiological assessment.
Assessment and treatment of patient with metastatic penile cancer
Selection of pharmacological, immunological and biological agents in penile cancer
Indications, contraindications and complications of treatment of penile cancer
Formulation of management plan with MDT
Selection of therapeutic approach for the treatment of penile cancer
Counsel and obtaining informed consent for treatment procedures.
Formulation of follow up plan

Procedures
Circumcision and penile biopsy
Partial penectomy
Glansectomy an skin grafting
Total penectomy
Inguinal LN dissection
Exteral iliac LN dissection
Laparoscopic pelvic lymph node dissection

[7e] testicular cancer

Knowledge
Embryology and anatomy of male genitalia including lymphatic drainage
Anatomy of retroperitoneum
Reproductive physiology
Pharmacology of cytotoxic agents used for testicular cancer.
Pathology of different kindly of testicular cancer and premalignant conditions.
Role of genetics, oncogenes and growth factors in testicular cancer
Role of environmental factors in testicular cancer
Past and current system for the staging and grading of testicular cancer
Theory and technique of radiological and nuclear imaging for testicular cancer
Theory and technique of radiotherapy for testicular cancer
Rationale, indications complications and result of surgery in treatment of testicular cancer.
Rationale, indications complications and result of surgery, chemotherapy and radiotherapy for testicular cancer.
Relevance of co-morbidities in the choice of therapy

Clinical skills
Assessment of patient with testicular cancer through appropriate use of staging, grading and tumour markers
Selection of imaging for testicular cancer
Formulation of management plan with MDT
Appropriate use of chemotherapeutic agents in testicular cancer.
Selection of pharmacological agents in patients with testicular cancer.
Counsel and attention to future fertility prospects.
Formulation of relevant follow up plan

Procedure
Radical orchidectomy
Insertion of testicular prosthesis
Retroperitoneal dissection

[8] Andrology

Knowledge
Anatomy, embryology and physiology of male reproductive system
Causes, assessment and management of male factor infertility
Methods of assisted fertilization
Anatomy, physiology and pharmacology of erection
Pathophysiology of erectile dysfunction
Risk factors and etiology for erectile dysfunction
Sexual function and aging
Assessment and investigation of erectile dysfunction.
Uses and limitation of Doppler US, cavernosography, cavernosometry and nocturnal penile tumescence test in erectile dysfunction
Cardiovascular function and disease relevant to sexual dysfunction
Endocrinology of sexual dysfunction
Hypogonadism
Therapeutic options for erectile dysfunction
Surgical management of man with erectile dysfunction.
Physiology of ejaculation
Physiology of female sexual function
Ejaculatory disorder- anatomy, physiology and management
Premature ejaculation
Retrograde ejaculation
Delayed ejaculation
Neuropharmacology and receptor pharmacology
Endothelial derived modulators of corporal smooth muscle
Oral pharmacotherapy for erectile dysfunction
Pharmacokinetics, adverse events and interaction of drug for erectile dysfunction
Intracavernosal, topical and intraurethral agents for erectile dysfunction
Pharmacology of drugs for priapism
Pharmacology of drugs for ejaculatory disorder
Causes and pathophysiology of ejaculatory disorders
Range of therapies for ejaculatory disorders
Testosterone replacement therapy
Anatomy, physiology and management of penile deformity
Causes and pathophysiology of penile deformity
Range of therapy for penile deformity
Surgical treatment for penile deformity
Causes and classification of penile dysmorphobia
Range of therapy for penile dysmorphobia
Surgical treatment for penile dysmorphobia
Causes, pathophysiology and management of prolong erection
Range of therapy for prolong erection
Surgical treatment for prolong erection
Mechanism of injury in penile fracture
Range of therapy for penile fracture
Assessment and management of penile fracture
Methods, results and complications of vasectomy
Varicocele – anatomy, physiology and management.

Clinical skills
Assessment and formulation of management plan for male infertility
Multidisciplinary approach in male infertility
Assessment and formulation of management plan for erectile dysfunction
Assessment of organic elements of erectile dysfunction
Medical management of erectile dysfunction
Indications, side effect, interactions and contraindications of drugs for erectile dysfunction, priapism, ejaculatory dysfunction.
Determination of appropriate surgical treatment for erectile dysfunction
Assessment and formulation of management plan for penile deformity, prolong erection, ejaculatory disorder, varicocele, penile fracture.
Determination of surgical approach for penile deformity
Determination of surgical approach for prolong erection
Determination of surgical approach for penile dysmorphobia
Assessment and management of man with premature ejaculation
Counsel and manage patient for vasectomy

**Procedure**

Nesbit procedure
Lue procedure
Vasectomy
Varicocelectomy
Surgical management of prolong erection: shunting procedures
Surgical management of penile fracture.
Nocturnal penile tumescence test
Cavernosometry
Insertion of penile prosthesis
Penile revascularization
Venous ligation
Division of suspensory ligament
Repair of suspensory ligament
Surgical repair of penile fracture

[8a] **Male factor infertility**

**Knowledge**

Anatomy and embryology of the genitalia and reproductive system and congenital abnormalities
Vascular, lymphatics and nerve supply of the genitalia and reproductive system and pelvic organs.
Genetics and male sexual and reproductive function, sexual differentiation, intersex, genetic abnormalities and infertility.

Male reproductive axis: hypothalamus, pituitary function, testis, endocrinology of testis, testosterone metabolism and effects of aging on male endocrinology

Spermatogenesis: genetic basis, hormonal regulation, Sertoli cell function

Physiology of male reproduction: epididymal function, physiology of vas deferens, seminal vesicles. Ejaculation. Role of prostate in sexual function.

Physiology of female sexual function

Physiology of female reproduction

Drugs/ gonadotoxins and their effect on male reproduction and sexual function.

Pharmacology of drugs for treatment of male factor infertility

Etiology and pathogenesis of male infertility

Antisperm antibodies and fertility

Varicocele and male fertility

Causes and Pathophysiology of testicular obstruction

Causes of male factor infertility

Causes of female factor infertility

Varicocele and male fertility

Endocrine disease and fertility, metabolic syndrome

Role of assisted conception in treatment of infertile couple

Surgical treatment of male factor infertility

Indication, methods, results and complications of sperm retrieval

Indication, methods, results and complications of assisted conception

Microsurgical treatment of male factor infertility

**Clinical skills**

Assessment and treatment of man or couple with male factor infertility

Indications, common side effects, interactions and contraindications of commonly used drugs for male infertility

Plan management of male factor infertility with MDT

Determination of appropriate surgical plan for infertility

**Procedures**

Varicocele operation

Testicular exploration and vasography

Transurethral resection of ejaculatory duct

Electroejaculation

Vaso-vasostomy
Testicular exploration and sperm extraction (TESE)
Percutaneous epididymal sperm aspiration (PESA)
Microscopic epididymal sperm aspiration (MESA)
Epididymovasostomy

**[9]Pediatric urology**

**Knowledge**

Anatomy and embryology of the pelvis, male genitalia, urethra, including embryology of hypospadias and epispadias.

Neuroanatomy of bladder, urethra and pelvic floor function

Physiology and neurophysiology of micturition and continence

Embryology and anatomy of common congenital abnormalities

Embryology, anatomy and natural history of intersex, spina bifida and posterior urethral valves

Bacteriology of UTI in childhood

Biological mechanism of upper and lower urinary tract infection, virulence and host defence

Pathophysiology and natural history of vesicoureteric reflux

Antibiotics for children and mechanisms of action

Pathogenesis, natural history and complication of torsion of testis

Differential diagnosis and management of acute scrotum

Etiology, pathophysiology and clinical features of upper urinary tract obstruction in childhood

Investigations for upper urinary tract obstruction in childhood

Techniques, indications and complications of different approaches to treatment of pelviureteric junction obstruction including percutaneous approach, laparoscopic approach and open surgical approaches.

Staging and classification of Wilms’ tumour and neuroblastoma

Pathology of the different types of benign an malignant tumours affecting the kidney

Current standards of treatment for common urological cancers in children

Theory and techniques of radiological and nuclear imaging for urological conditions in children

Natural history and normal patterns of continence

Clinical presentation and differential diagnosis of urinary incontinence

Anatomy, physiology and pharmacology of bladder and sphincter mechanisms

Etiology, epidemiology, pathology and classification of incontinence in childhood

Natural history of enuresis

Causes of neuropathic bladder and types of presentation
Techniques of reconstruction of bladder and ureter
Basic genetics of uropathological conditions
Pathophysiology of hypospadias and epispadias
Causes, pathophysiology and complications of urethral stricture.
Techniques of assessment for bladder and urethral reconstruction including urodynamics, radiological and nuclear imaging.
Indications, techniques and complications of urethral reconstruction

Clinical skills
Assessment, prognosis and management plans for common congenital urological disorders including undescended testis, duplex systems, reflux and hydronephrosis
Assessment, prognosis and management plans for spina bifida, intersex and posterior urethral valves.
Assessment of hypospadias and epispadias
Indications, side effects, interactions and contraindications of drugs used in children with urinary symptoms.
Diagnosis and management of inguinal scrotal abnormalities including undescended testis, hydrocele, testicular torsion and phimosis
Investigation and management plan of UTI in children
Identification of significant infection and symptomatic bacteriuria
Selection of antibiotics for childhood UTI
Selection of surgical approach for vesicoureteric reflux
Assessment of patient with acute scrotal pain
Interpretation of investigations in acute scrotal pain
Management of acute scrotal pain in children
Assessment of unilateral or bilateral renal obstruction
Management of urosepsis
Management plan for patient with PUJ obstruction
Interpretation of investigations for PUJ obstruction
Selection of treatment options for PUJ obstruction
Counsel and obtain informed consent for procedures for PUJ obstruction
Assessment of child with Wilms’ tumour or neuroblastoma with use of stage, grade and molecular markers.
Selection of imaging for pediatric renal tumour
Formulation of management plan for common urological cancers with MDT
Management plan for enuresis
Assessment with history, examination and frequency volume chart of urinary incontinence and neuropathic bladder
Formulation of management plan for urinary incontinence and neuropathic bladder with MDT
Medical management of urinary incontinence in children
Selection of surgical procedure for child requiring reconstruction of bladder or ureter
Assessment of patients requiring reconstruction of urethra
Selection of surgical options for urethral construction
Management of postoperative consequences of urethral reconstruction
Selection of procedures for hypospadias.
Counsel and obtain informed consent for procedures for hypospadias.

**Procedures**
- Urodynamics studies
- Circumcision
- High ligation for hydrocele
- Orchidopexy
- Surgical management of acute scrotum
- Surgical exploration of torsion of testis with fixation
- Surgery for ureteric reflux
- Endoscopic treatment of reflux
- Open ureteric reimplantation
- Radical nephrectomy and laparoscopic nephrectomy in children
- Ureteric anastomosis
- Ureteric reimplantation
- Augmentation/ substitution cystoplasty
- Continent urinary diversion
- Vaginal reconstruction
- MAGPI repair
- Harvesting buccal mucosal graft
- Snodgrass repair
- Two stage buccal graft urethroplasty
- Surgery for epispadias

[10] Renal function and nephrology

**Knowledge**
- Physiology of renal function
- GFR estimation techniques
- Tubular function and dysfunction
- Basic pathology of acute and chronic renal failure
Principles of dialysis, renal preservation
Etiology, diagnosis and early management of acute tubular necrosis and pre-renal failure
Mechanism of obstructive uropathy
Causes and pathophysiology of bilateral and unilateral obstruction
Principles of hemodialysis and peritoneal dialysis
Indwelling cannulae for hemodialysis
Temporary dialysis technique
Continuous ambulatory peritoneal dialysis
Recipient selection and indications for transplantation
Tissue typing and cross matching for transplantation
Relative indication for hemodialysis
Immunosuppression for transplantation
Complications of renal transplantation

Clinical skills
Practical GFR assessment
Assessment and management of anuria, obstructive uropathy, tubular disorders and renal failure.
Assessment and management of fluid/acid base balance
Management of postobstructive diuresis
Ambulatory dialysis technique
Evaluation of potential recipients for renal transplantation
Urinary tract workup of potential recipients prior to transplantation.
Choice of renal replacement therapy
Management of complications related to dialysis access

Procedures
Tenckhoff catheter insertion
Tenckhoff catheter removal
A-V fistula formation
Assisted in open/lap living donor nephrectomy, cadaveric kidney harvest and renal transplantation.

[10a] Renal transplantation
Knowledge
Anatomy of retroperitoneum and great vessels
Embryology of development of kidney and common variation in blood supply
Pharmacology of drugs for immunosuppression
Pharmacology of perfusion fluids and use of diuretics
Pharmacology of inotropes and blood pressure control and effects of drugs on renal blood flow.
LLA matching
Cytotoxic cross match
Rejection
Immunosuppression
Causes and classification of renal failure
Pathophysiology and clinical features of renal failure
Treatment options for renal failure
Indications and contraindications for renal transplantation.
Indications and types of dialysis
Access for dialysis
Complication of dialysis
Criteria for brainstem death
Pathophysiology of brainstem death
Principles of donor management and organ preservation
Selection criteria for patients from the waiting list

Clinical skills
Assessment and management of organ donors (life or cadaveric)
Assessment of patients referred for vascular access
Identify appropriate access site
Management of complications of vascular access
Assessment of patients referred for peritoneal dialysis access
Management of patients with peritoneal dialysis catheter
Management of complications of peritoneal dialysis catheter including peritonitis
Assessment of patients requiring renal transplantation or renal replacement therapy
Counsel and obtaining informed consent from living donor
Management of recipient peri-operatively
Management of complications of renal transplantation
Follow up of patients with renal transplants

Procedures
Peritoneal dialysis catheter insertion
Peritoneal dialysis catheter removal
Central venous line insertion
A-V fistula formation at wrist and elbow
Ligation of AV fistula
Cadaveric donor nephrectomy for transplantation
Open / laparoscopic donor nephrectomy for transplantation
Preparation of kidney for transplant
Kidney transplant
Transplant nephrectomy
Lymphocelelectomy


Knowledge
Pathophysiology and renal adaptation to ureteric obstruction
Presentation and clinical course of urinary tract stone
Role of IVU, USG and CT in diagnosis of renal colic
Management options for ureteric colic
Complications of urinary tract stone including urosepsis
Pharmacology of pain relief for renal colic
Endoscopic management of ureteric stones
Causes and pathophysiology of urinary tract infection
Clinical presentation and renal function changes in urinary tract infection
Antibiotics and relevant pharmacology
Indications for further investigation of urinary tract infection
Causes, epidemiology and pathophysiology of acute and chronic urinary retention
Treatment options for acute and chronic urinary retention
Causes and pathophysiology of hematuria
Causes and pathophysiology of coagulation disorders
Pathophysiology of testicular torsion
Pathophysiology of epididymitis
Clinical features and differential diagnosis of testicular pain
Causes, pathophysiology, clinical features and management of Fournier’s gangrene
Causes, pathophysiology, clinical features and management of paraphimosis
Causes, pathophysiology, clinical features and management of priapism
Causes, pathophysiology, clinical features and management of penile fracture

Clinical skills
Emergency assessment and treatment of ureteric colic
Emergency assessment and management of obstruction and sepsis
Detection of complication of obstruction, renal failure and renal/ peri-renal abscess
Diagnosis and management of urinary tract infection
Assessment, investigation and formulation of a management plan for acute and chronic urinary retention.
Assessment of fluid balance and renal function.
Management of post-obstructive diuresis
Assessment, investigation and management of patient with hematuria
Assessment, investigation and management of acute scrotal pain
Assessment, investigation and management of epididymitis
Assessment, investigation and management of scrotal abscess
Assessment, investigation and management of Fournier’s gangrene with multidisciplinary team engagement
Assessment, investigation and management of paraphimosis
Assessment, investigation and management of priapism
Assessment, investigation and management of penile fracture

Procedures
Cystoscopy & JJ stent insertion, PCN
Percutaneous suprapubic catheter insertion
Cystoscopy and bladder washout
Surgical exploration for torsion of testis with fixation
Surgical management of scrotal abscess
Surgical management of Fournier’s gangrene
Reduction of paraphimosis and dorsal slit circumcision
Operative management of priapism
Operative management of penile fracture.

[12] Trauma to Urinary Tract
Knowledge
Causes, pathophysiology, classification and management of renal trauma
Causes, pathophysiology, classification and management of ureteric trauma
Causes, pathophysiology, classification and management of bladder trauma
Causes, pathophysiology, classification and management of urethral trauma
Causes, pathophysiology, classification and management of genital and testicular trauma

Clinical skills
Resuscitation, live support and liaison with other specialties in multiple trauma
Assessment and management of renal trauma
Assessment and management of ureteric trauma
Assessment and management of urethral trauma
Assessment and management of genital and testicular trauma

**Procedure**
Testicular repair
Orchidectomy
Percutaneous suprapubic catheter insertion

**[13] Urological radiology**

**Knowledge**
Principles of ionizing radiation
Patient and physician protection against radiation
Investigation related radiation dose
Common radiological investigations in urology
Principles of isotope and isotope imaging
Application of isotopes to functional assessment
Techniques of interventional radiology
Indications, limitations and complications of interventional radiology
IVU: basic theory, practical techniques, contrast agents, indications, interpretation and limitations, safety and contraindications.
Ultrasound: basic theory, practical techniques, contrast agents, indications, interpretation and limitations
CT scan: basic theory, practical techniques, contrast agents, indications, interpretation and limitations, safety and contraindications.
MR scan: basic theory, practical techniques, contrast agents, indications, interpretation and limitations, safety and contraindications
PET scan: basic theory, practical techniques, contrast agents, indications, interpretation and limitations, safety and contraindications
Renography: basic theory, practical techniques, contrast agents, indications, interpretation and limitations, safety and contraindications.

**Clinical skills**
Indications for use of ionizing radiation in urological investigations
Indications for use of ultrasound in urological investigations.
Resuscitation of complications with contrast imaging
Selection of appropriate isotope investigations.
Interpretation of renograms
IVU: therapeutic application, interpretation and limitations
Ultrasound: therapeutic application, interpretation and limitations
CT scan: therapeutic application, interpretation and limitations
MR scan: therapeutic application, interpretation and limitations
PET scan: therapeutic application, interpretation and limitations
Renography: therapeutic application, interpretation and limitations

**Procedures**

**IVU**
- Cystogram
- Urethrogram
- Retrograde pyelogram
- Renal ultrasound
- Bladder ultrasound
- Scrotal ultrasound
- Transrectal ultrasound with biopsy