Basic Urological Management
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Welcome to Basic Urological Management. We hope you enjoy and learn from this book. The aim of this book is to not only gain knowledge but an understanding of patient pathways and what to do next for patients at different steps in each pathway. It is perfectly fine not to know something in medicine and then to go and study about a topic or area. It is how we evolve our knowledge. The key is to study it in detail and then apply that knowledge to each clinical situation.

Everyone, at some point, has been at the start of their career. As a young doctor, I often had a difficult time, with consultants who expected a CCT level of knowledge, prior to gaining a training number. A few situations in particular stood out in my mind, where a knowledge of patient pathways or what to do in each specific clinic scenario would have helped. I had been through the library of textbooks to no avail. I needed a practical book that told me what to do and when.

It was in that job that I started to write. The first thing I wrote was a list of clinical management scenarios; it would be good to be aware of those scenarios as a junior doctor. This book is written entirely from that. In the words of one of my favourite consultants, ‘You have to learn to cut your teeth somewhere.’ (You have to start somewhere.) Work and train hard, and treat your patients as if they were family, and you will succeed.

London, UK  Sanchia S. Goonewardene
Southend, UK  Peter Pietrzak
Syracuse, NY, USA  David Albala
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<td>AAA</td>
<td>Abdominal aortic aneurysm</td>
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<td>AAST</td>
<td>American Association for the Surgery of Trauma</td>
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<td>ADH</td>
<td>Antidiuretic hormone</td>
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<td>A+E</td>
<td>Accident and emergency</td>
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<td>AMH</td>
<td>Asymptomatic microhematuria</td>
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<tr>
<td>ATLS</td>
<td>Advanced Trauma Life Support</td>
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<tr>
<td>AUA</td>
<td>American Urological Association</td>
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<td>AVM</td>
<td>Arteriovenous malformation</td>
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<tr>
<td>BCG</td>
<td>Bacillus Calmette-Guerin</td>
</tr>
<tr>
<td>BD</td>
<td>Twice daily</td>
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<tr>
<td>BP</td>
<td>Blood pressure</td>
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<td>BPH</td>
<td>Benign prostatic hypertrophy</td>
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<td>BXO</td>
<td>Balanitis xerotica obliterans</td>
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<tr>
<td>CCF</td>
<td>Congestive cardiac failure</td>
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<tr>
<td>CIS</td>
<td>Carcinoma in situ</td>
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<tr>
<td>CT</td>
<td>KUB Computed tomography of kidneys, ureters and bladder</td>
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<tr>
<td>CT IVU</td>
<td>Computed tomography intravenous urogram</td>
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<tr>
<td>CKD</td>
<td>Chronic kidney disease</td>
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<td>Cr</td>
<td>Creatinine</td>
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<td>CXR</td>
<td>Chest radiograph</td>
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<td>CXM</td>
<td>Crossmatch</td>
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<td>DRE</td>
<td>Digital rectal examination</td>
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<td>DM</td>
<td>Diabetes mellitus</td>
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<tr>
<td>DI</td>
<td>Diabetes insipidus</td>
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<tr>
<td>EAU</td>
<td>European Association of Urology</td>
</tr>
<tr>
<td>ED</td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>EGFR</td>
<td>Estimated glomerular filtration rate</td>
</tr>
<tr>
<td>ESWL</td>
<td>Extracorporeal shockwave lithotripsy</td>
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<tr>
<td>FFP</td>
<td>Fresh frozen plasma</td>
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<tr>
<td>FBC</td>
<td>Full blood count</td>
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<tr>
<td>Fr</td>
<td>French</td>
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<tr>
<td>FSH</td>
<td>Follicle-stimulating hormone</td>
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<td>GA</td>
<td>General anaesthesia</td>
</tr>
<tr>
<td>G+S</td>
<td>Group and save</td>
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</table>
GU  Genitourinary
HB  Haemoglobin
HD  Haemodynamically
HOLEP  Holmium Laser Enucleation of the Prostate
HPCR  High-pressure chronic retention
HPV  Human papillomavirus
ICIQ-SF  International Consultation on Incontinence Questionnaire – Short Form
IIEF  International Index of Erectile Function
ISC  Intermittent self-catheterisation
IVC  Inferior vena cava
IVI  Intravenous infusion
IV  Intravenous
IVU  Intravenous urogram
IPSS  International Prostate Symptom Score
LA  Local anaesthesia
LFTs  Liver function tests
LH  Luteinising hormone
LHRH  Luteinising hormone-releasing hormone
LPCR  Low-pressure chronic retention
LTC  Long-term catheter
LUTS  Lower urinary tract symptoms
MAG 3 Nuclear Medicine MAG 3 Renogram
MC+S  Microscopy, culture and sensitivity
MDT  Multidisciplinary team meeting
MIBC  Muscle-invasive bladder cancer
MRI  Magnetic resonance imaging
MS  Multiple sclerosis
NBM  Nil by Mouth
NICE  National Institute for Clinical Excellence
NMIBC  Non-muscle-invasive bladder cancer
Na  Sodium
NSAIDs  Nonsteroidal anti-inflammatory drug
NVH  Non-visible haematuria
OAB  Overactive bladder
Obs  Observations
OD  Once daily
OPA  Outpatient appointment
OPD  Outpatient department
PIRADS  Prostate Image Reporting and Data System
PPI  Proton-pump inhibitor
PSA  Prostate-specific antigen
PCNL  Percutaneous nephrolithotomy
PUJO  Pelviureteric junction obstruction
PV Per vaginum
PVR Post-void residual
Pt Patient
Qmax Maximum flow rate
RCC Renal cell carcinoma
RESP Rate Respiratory rate
Sats Saturation
SCC Squamous cell carcinoma
SHBG Sex hormone-binding globulin
SHIM Sexual Health Inventory for Men
SIRS Systemic inflammatory response syndrome
SIADH Syndrome of inappropriate antidiuretic hormone secretion
SPC Suprapubic
STIs Sexually transmitted infection
T stage Tumour staging for cancer
TIS Tumour in situ
TED Thromboembolic device
TB Tuberculosis
TCC Transitional cell carcinoma
TFTs Thyroid function tests
TURBT Transurethral resection of the bladder tumour
TURP Transurethral resection of the prostate
TOT Transobturator tape
TVT Transvaginal tape
TWOC Trial without catheter
U+Es Urea and electrolytes
USS Ultrasound scan
USS KUB Ultrasound scan of kidneys, ureters and bladder
UTI Urinary tract infection
UV Ultraviolet
VUR Vesicoureteric reflux
WCC White cell count
Visible Haematuria

Referral criteria

- As per NICE Guidance NG12, 2011.
- Aged 45 or over: unexplained visible haematuria without UTI.
- Visible haematuria that persists or recurs after UTI treatment.
- Non visible haematuria and either dysuria or raised WCC.
- See patient as Target in haematuria clinic - 2 week wait (NICE Guidance).

Causes

- As per AUA guidelines, look for a cause:
  - Neoplastic (renal cancer, urothelial cancer, bladder cancer (TCC-most common, SCC or adenocarcinoma), prostate cancer).
  - Infection: UTI, cystitis, prostatitis.
  - Inflammation: interstitial cystitis.
  - Stones (renal, ureteric, bladder).
  - Trauma (renal, ureteric, bladder, prostate or urethra).
  - Nephrological: Intrinsic renal disease, nephropathies.
  - Blood dyscrasias and anticoagulation.
  - Benign Prostatic Hyperplasia - large vascular prostate.
  - Visible haematuria can indicate bleeding or clots from anywhere in the urinary tract.
**History**
- A comprehensive patient history is mandatory, EAU Guidelines, 2018.
- History: Extent and duration of haematuria, position in stream.
- UTIs, STIs, LUTS.
- Abdominal pain - look for stones/ infection/ clot colic/ tumour.
- Red flags: weight loss, bony aches, backache.
- Travel history: any recent foreign travel abroad - schistosoma/ TB.
- Past urological history: stones, trauma, cancer. Prior urological/ haematuria investigations. Even if investigated previously for haematuria, repeat investigations.
- Anticoagulation therapy.
- Prior bladder/ prostate radiotherapy.
- Risk factors: smoking, dyes, aromatic amines, hydrocarbons, occupation (Hairdressers).

**Examination**
- As per NICE Guidance on cancer recognition and referral.
- General exam- pallor, haemodynamic stability.
- Abdomen: palpable masses in flanks (renal mass), flank tenderness (stones). SPC mass (bladder mass or retention).
- Review of external genitaiia with a chaperone (testicular tumour, epididymoorchitis or penile cancer), review of glans (CIS, penile SCC).
- PV- make sure the patient is consented for this ( to see if the bladder is fixed, cervical tumours).
- DRE: size, consistency, firmness of prostate gland (prostate cancer), nodular prostate (BPH) ? boggy prostate (prostatitis, abcess).
**Outcome**
- Identify patient performance status, fitness for anaesthetic and surgery.
- If bladder tumour is identified- for TURBT as target patient - histology is needed as first line management.
- Make sure the patient has a CT IVU if EGFR >30, and a CT chest for completion if muscle invasive.
- If there is a red patch on cystoscopy, for GA rigid cystoscopy and biopsy.
- If RCC or upper tract TCC identified or cytology positive, for renal MDT regarding ureteroscopy, nephrectomy or nephroureterectomy.
- If stones identified- stone MDT for surveillance, ESWL, PCNL, or Ureteroscopy as appropriate.

---

**Investigations**
- As per EAU Guidelines on Investigation of bladder cancer:
- Urine dip and culture- if urine dip positive, patient cannot have flexible cystoscopy- send off MC+S and treat infection with region specific antibiotics.
- Bloods including renal function pre scan- EGFR >30 required. Also FBC (HB).
- Urine cytology- detects 90% of high risk cases and 10 % of low risk cases. This is controversial, but most useful for established bladder cancer follow-up.
- CT IVU if EGFR >30 ( to review upper tracts and look for filling defects).
- Flexible cystoscopy: conducted under LA, via aseptic technique. Zero degree lense to view inside of bladder- aim- identify bladder tumour, usually TCC.

---

**Visible Haematuria**
Fig. 1.1 Haematuria- from dark haematuria to light rose

Fig. 1.2 Flexible cystoscopy kit- you will need a light source, giving set and saline to go with the scope. Part of haematuria assessment
Suggested Reading

AUA Guidelines on Diagnosis, Evaluation and Follow-up of Asymptomatic Microhematuria (AMH) in Adults, 2016.
NICE Guidance on Cancer Recognition and Referral, NG12, 2011.
Diagnostic Pathway for Haematuria

- **Visible CT IVU and Flexible cystoscopy**
  - Urine dip and cytology
  - 2ww referral pathway

- **Bladder tumour**
  - TURBT (Resection of bladder tumour with deep muscle biopsy and random biopsies), then MDT with CT chest for completion of staging 31 days to diagnose, 62 days to treat

- **Prostate cancer diagnostics**
  - Large Prostate - DRE, if abnormal, PSA, MRI and transperineal template biopsy.
  - If benign, finasteride to help bleeding from prostate

- **Benign causes**
  - Stones - Assess to see if obstructed - if so, stent or primary ureteroscopy
  - Bloods including calcium, urate and TFTs
  - Management dependant on size and position of stone

- **Infectious cause**
  - UTI Renal, ureteric or bladder stones
  - Nephrological cause - IGA nephropathy, Goodpastures syndrome, Wegners Granulomatosis.
Fig. 2.1 An upper tract TCC on IVU

Fig. 2.2 An upper tract TCC on CT Urogram
Fig. 2.3 An MRI demonstrating upper tract TCC

Fig. 2.4 A ureteroscope, to investigate upper tract TCC
**Fig. 2.5** Demonstrating tip deflection of ureteroscopes

**Suggested Reading**

AUA Guidelines on Diagnosis, Evaluation and Follow-up of Asymptomatic Microhematuria (AMH) in Adults, 2016.


NICE Guidance on Cancer Recognition and Referral, NG12, 2011.
Non-Visible Haematuria

Referral criteria

- See patient as Target in haematuria clinic.
- Haematuria (non-visible and unexplained) with dysuria or raised white cell count on a blood test, 60 and over.
- None urgent referral-people aged 60 and over with recurrent or persistent unexplained urinary tract infection.
- 90% of cases will have no underlying pathology.

Causes

- AUA Guidelines, 2016 specify to look for a cause.
- Causes:
  - Infection: UTI, cystitis, prostatitis.
  - Inflammation- insertitial cystitis.
  - Stones (renal, ureteric, bladder).
  - Trauma (renal, ureteric, bladder, prostate or urethra).
  - Cancer (renal cancer, urothelial cancer, bladder cancer (TCC or SCC), prostate cancer).
  - Intrinsic renal disease, nephropathies, CKD, nephrological causes, hypertension.
  - Blood dyscrias and anticoagulation.
  - BPH-large vascular prostate.
Examination

- Abdomen: pallor, haemodynamic stability, palpable masses in flanks (renal mass), flank tenderness (stones), SPC mass (bladder mass or retention).
- Review of external genitalia with a chaperone (testicular tumour, epididymo-orchitis or penile cancer), review of glans (CIS, penile SCC).
- Per Vaginal Examination - make sure the patient is consented for this and you are chaperoned (to see if the bladder is fixed, cervical tumours, gynaecological malignacies).
- DRE: size, consistency, firmness of prostate gland (prostate cancer), nodular prostate (BPH), tender/ boggy prostate (prostatitis, abscess).

Investigations

- As per EAU Guidelines, 2018.
- Urine dip and culture- if urine dip positive, patient cannot have flexible cystoscopy- send off MC+S and treat infection with region specific antibiotics.
- Renal function and FBC (HB).
- Urine cytology.
- USS KUB: USS examination of kidneys, ureter and bladder.
- Flexible cystoscopy: conducted under LA, via aseptic technique. Zero degree lense to view inside of bladder- aim- identify bladder TCC.

History

- A focused history is key. EAU Guidelines, 2018.
- History: Extent and duration of haematuria, other causes (UTIs, STIs, LUTS/ Retention)
  Red flags: weight loss bony aches backache, chest symptoms.
- Travel history: any recent foreign travel abroad- schistosoma/ TB.
- Past urological history: stones, trauma, cancer.
- Risk factors: smoking, dyes, aromatic amines, hydrocarbons.

Non-Visible Haematuria
Suggested Reading

AUA Guidelines on Diagnosis, Evaluation and Follow-up of Asymptomatic Microhematuria (AMH) in Adults, 2016.
NICE Guidance on Cancer Recognition and Referral, NG12, 2011.
Management Pathway for Bladder Tumour

**TURBT fit for anaesthetic**
- If patient not fit for anaesthetic, take the decision of risk back to patient and give them the options of operative and anesthetic risk including mortality vs. no operation and radiotherapy instead. If elderly patient may only be fit for endoscopic follow-up.

**TURBT Intermediate risk disease, CT IVU CT chest**
- TURBT Intermediate risk disease, CT IVU CT chest
- Follow-up with flexible cystoscopy at 3, 9 and 12 months. Recurrence of tumor - go back to start of TURBT management pathway
- BCG if fit and MDT approved. Intravesical instillation of immunotherapy (BCG) given for one hour once a week for 6 weeks (BCG Induction), with GA rigid cystoscopy at 2 months to review - if clear for BCG 3 monthly (3 doses over 3 weeks) with flexible cystoscopy 6 monthly up to 3 years (BCG Maintenance). The alternative is MMC.
- Endoscopic follow-up, every 3 months for 2 years, then 6 monthly to 5 years, annually up to 10 years. If tumour recurs back to start of pathway.
- BCG or radiotherapy if not fit for radical cystectomy. Alternatively, endoscopic management (resection of tumour) if elderly patient. If completely unfit for any therapy, for palliative care.
- If muscle invasive disease, for neoadjuvant chemotherapy then radical cystectomy and lymph node dissection.

**TURBT High risk disease, CT IVU CT chest**
- TURBT High risk disease, CT IVU CT chest
- If patient not fit for anaesthetic, take the decision of risk back to patient and give them the options of operative and anesthetic risk including mortality vs. no operation and radiotherapy instead. If elderly patient may only be fit for endoscopic follow-up.

**Follow-up with flexible cystoscopy at 3, 9 and 12 months. Recurrence of tumor - go back to start of TURBT management pathway**
- If small papillary tumor for MMC intravesically then TURBT the next morning CT Chest, CT IVU Low risk disease
- CT Chest, CT IVU Low risk disease
- Low risk disease
- Follow-up with flexible cystoscopy at 3, 9 and 12 months. Recurrence of tumor - go back to start of TURBT management pathway
- If small papillary tumor for MMC intravesically then TURBT the next morning CT Chest, CT IVU Low risk disease
- TURBT fit for anaesthetic
Fig. 4.1 Bladder tumour—a papillary and solid TCC

Fig. 4.2 Identifying ureteric orifice during tumour resection
Fig. 4.3  Bladder base after tumour resection

Fig. 4.4  Demonstrating blue light- hexyl- aminolevulinate gives off fluorescence under blue light allowing detection of bladder tumours

Suggested Reading

NICE Guidelines Bladder Cancer Diagnosis and Management, 2015.
Elevated PSA/Abnormal DRE

Referral criteria

- PSA elevated according to age specific criteria.
- PSA is a 32 KD serine protease that liquifies the seminal ejaculate.
- The exact purpose is unknown.
- If the DRE is abnormal, or PSA elevated, refer patient to hospital as a 2 week wait patient. NICE Guideline, NG2.
- There is no evidence for PSA screening below the age of 54 routinely. AUA guidelines, 2013.
- If a patient has a strong family history or Afro - carribean ethnicity, decisions to screen should be individualised. AUA Guidelines, 2013.
- The risk of prostate cancer in these groups is far higher.

Causes

- Causes
  - Cancer (Prostate cancer - adenocarcinoma)
  - Infection: UTI, prostatitis
  - Prostatic calcific
  - Trauma to the prostate - catheterisation, flexible cystoscopy
  - BPH - enlarged prostate
History

• UTIs, STIs.
• LUTS - storage (Frequency, urgency, nocturia) and voiding (weak stream, strain, hesitancy), post micturition (terminal dribbling).
• IPSS scoring.
• Erectile function (SHIM score) and continence.
• Abdominal pain - retention.
• Red flags: weight loss bony aches backache.
• Past urological history: stones, trauma, cancer.
• Family history of prostate cancer - having 1 relative affected doubles your risk.

Examination

• Abdomen: palpable masses in flanks (renal mass), flank tenderness/ iliac fossa tenderness (stones), SPC mass (bladder mass or retention).
• Review of external genitalia with a chaperone (epididymo-orchitis), review of external meatus for stenosis.
• DRE: size, consistency, firmness of prostate gland (prostate cancer, EAU Guidelines 2018), nodular prostate (BPH/prostate cancer, post TURP) boggy tender prostate (prostatitis, abscess).

Investigations

• As per EAU and NICE Guidance
• Urine dip and culture
• Repeat PSA - elevated on 2 samples
• MRI pelvis prostate with contrast
• If MRI positive (PIRADS 4 or 5), for transperineal template biopsy of prostate
• Target biopsies of affected regions on MRI

Outcome

• Identify patient performance status, fitness for anaesthetic and surgery.
• Discuss imaging and biopsies results at Prostate MDT.
• Mapping meeting prior to target biopsies.
• Risk stratify patient into low intermediate or high risk. EAU Guidelines, 2018.
Fig. 5.1 Transperineal template biopsy probe and mount. It is imperative, everything is put together correctly and the probe is positioned correctly. If this is the case, the operation will be straightforward. If not, you do not know the sectors you are taking the biopsies from.

Fig. 5.2 Appearance of prostate via transrectal uss probe.

Fig. 5.3 A transrectal probe with air artefact on screen- take the probe out, re prep it and re-insert.
Suggested Reading

NICE Guidance NG 2, 2008.
Diagnostic Pathway for Prostate Cancer

**Elevated PSA x2**

Reference ranges:
- <2.5 40-50 years
- <3.5 50-60 years
- <4.5 60-70 years
- <6.5 70-80 years

**Young patients (<75 years)**
- Elevated PSA and abnormal DRE
- Note IPSS Score, prostate volume
- Multiparametric MRI before Transperineal Template Biopsy (look for lesions to target and radiographic T stage.)

**Bladder tumour**
- TURBT, then MDT, CT IVU
- CT chest

**None tumour cause**
- Stones - management dependant on size and position of stone
- Large Prostate - DRE, if abnormal, PSA, MRI and transperineal template biopsy (if benign, finasteride to help bleeding from prostate)

**Elderly patient (>75 years), or with less than 10 years life expectancy**
- Elevated PSA and Abnormal DRE
- If no bone pain and PSA less than 15, Multiparametric MRI of the prostate and limited e.g. 4 core transperineal template biopsy of the prostate
- If bone pain/PSA 15 or greater, Nuclear Medicine Whole body bone scan to look for bony metastasis. If present start on hormone therapy (Anti-androgens for two weeks Bicalutamid or cyproterone acetate), then goserelin injections (10.8mg subcutaneous once a month for 3 months). Check PSA at 3 months.

**Stones - management dependant on size and position of stone**
- Large Prostate - DRE, if abnormal, PSA, MRI and transperineal template biopsy (if benign, finasteride to help bleeding from prostate)
Suggested Reading

NICE Guidance NG 2, 2008.
Management Pathway for Prostate Cancer in Younger Patients

Young patient (<75 years)

Low risk disease
PSA < 10
T2a or less
Gleason 3+3

Active Surveillance PSA 3 monthly, transperineal template biopsy of prostate at start at every 2 years, monitor PSA doubling time. DRE annually. Consider radical therapy if the PSA rises or there are sudden jumps, biopsy/ MRI demonstrates upgrading or upstaging or the PSA doubling time is less than 6 months.

If fit, radical prostatectomy: laparoscopic or robotic. Risks: infection, bleeding, ED, incontinence, recurrence, further radiotherapy, rectal/bowel injury/stoma. Oncological outcomes are similar to radiotherapy.

Brachytherapy Implantation of technetium 99 seeds into prostate. Risks of ED and incontinence and bowel injury lower than surgery. Side effects: infection, bleeding, AUR, passage of seed in urine.

Radical radiotherapy 68 gray delivered over 6 weeks, patient goes in every day for radiotherapy. Side effects: Haematuria, radiation cystitis, ED. Further treatment.

Intermediate risk PSA 10-20,
Staging T2b Gleason 7
(3+4 or 4+3)-most common gleason 1st (Active Surveillance not recommended)

Radical prostatectomy/Radical Radiotherapy/Brachytherapy only if 3+4 and 50% of biopsy core length. Not for cryotherapy except as part of a trial

High risk disease PSA 20 or greater staging T2c or above
Gleason 4+4 Consider neoadjuvant hormone therapy for 3 months prior to radical prostatectomy or radiotherapy and neoadjuvant hormone therapy for 2 years afterwards

Radical prostatectomy/Neoadjuvant hormone therapy for 3 months prior to radical prostatectomy or radiotherapy and neoadjuvant hormone therapy for 2 years afterwards
Suggested Reading

NICE Guidance NG 2, 2008.
Management Pathway for Older Patients with Prostate Cancer

Patient >75 years

Elevated PSA (<15) and abnormal DRE
MRI and limited biopsy positive Localised disease

When PSA hits 15, bone scan for metastases and start an anti androgen and LHRH agonist
Monitor PSA 3 monthly for response.

If patient fit, consider radiotherapy
with PSA monitoring

PSA >15 and bone scan positive (Metastases) or PSA>15
and MRI shows locally advanced disease

Discuss whether patient wants treatment and follow-up - side effects of hormone therapy, hot flushes, muscle weakness, breast development, follow-up PSA to be checked 3 monthly

If patient is happy for side effects of treatment, commence hormone therapy and PSA follow-up 3 monthly

Suggested Reading

NICE Guidance NG 2, 2008.
Management of TRUS Biopsy Sepsis

- Patient presents post TRUS biopsy with sepsis.
- Focused history: extent of fevers, rigors, when patient had biopsy, antibiotic cover, dysuria, LUTS, AUR. Identify risk factors for sepsis: Diabetes, steroid usage, immunosuppression.
- Investigations: Bloods, Urine analysis and blood culture, ABG for lactate, Bladder scan.
- Examination: Obs, Resp rate, O2 Sats, Temperature, Abdomen- masses, bladder, TRUS biopsy site- check for infection.
**Suggested Reading**

Haematospermia

Referral criteria

- As per NICE Guidelines on Cancer recognition.
- >40 years with no identifiable cause.
- Men of any age with signs and symptoms suggestive of prostate cancer (such as elevated PSA levels, suspicious findings on digital rectal examination).
- Signs or symptoms suggestive of testicular or urological malignancies.
- >10 episodes of haematospermia, with no identifiable cause found in primary care.
- Cysts or calculi of the prostate or seminal vesicles.
- Persistent haematospermia.

Causes

- Cancer: Prostate cancer, epididymal, or testicular cancer.
- Infection: UTI/STI, epididymo-orchitis, infection of seminal vesicles, Schistosoma haematobium and Trichomonas.
- Inflammation-Chronic or acute prostatitis (chronic pelvic pain syndrome), urethritis.
- Stones: prostatic, bladder, ureteric calculi.
- Bleeding disorders or anticoagulation.
- Trauma to the urinary tract, post op, post TRUS biopsy, post brachytherapy.
**Examination**
- BP
- SPC mass (bladder mass).
- Scrotal examination (penile lesions, palpate the vas-is it TB?), review of external urethral meatus-discharge (STI).
- Examine the testes and epidydimis (TB or tumour).
- DRE: size, consistency, firmness of prostate gland (prostate cancer), tenderness (prostatitis), seminal vesicles (usually none palpable, if palpable, prostate cancer).

**Investigations**
- As Per NICE Guidance.
- Urine analysis and culture.
- First line investigations.
  - Flexible cystoscopy-if urine analysis negative.
  - CT IVU-look for a cause of haematuria that could be presenting as haematospermia.
- Urine cytology.
- STI screen if indicated at a GU clinic.
- PSA if abnormal DRE.
- If persistent haematuria, second line investigations: MRI and TRUS biopsy of prostate.

**Outcome**
- Treat the cause.
- Infection UTI/ STI screen -send off cultures, treat with antibiotics according to hospital policy.
- Chronic or acute prostatitis (chronic pelvic pain syndrome) - As per NICE guideline, Ciprofloxacin 500 mg PO BD, with Tamsulosin 0.4 mg PO OD and an NSAID.
- Prostate cancer- check 2 PSAs, MRI prostate or bone scan as appropriate, then Prostate MDT follow-up.
- Trauma to the urinary tract-treat according to severity and site of trauma- conservative (renal trauma grades 1-4 if HD stable), vs surgical management (renal trauma grade 5) - see trauma chapters.
- Exotic infections such as *Schistosoma haematobium* and *Trichomonas* spp-infectious diseases review.
**Suggested Reading**


NICE Clinical Knowledge Summary on Haematospermia.
Diagnostic and Management Pathway for Haematospermia

11

**Haematospermia**

1. **1st line haematuria investigations**
   - CT/IVU and flexible cystoscopy, urine cytology

2. **If DRE abnormal, PSA test x2-if elevated for MRI and transperineal sector template biopsies of prostate**

3. **2nd line investigations**
   - MRI and transperineal template biopsy of the prostate

4. **Tumour-in GU tract-treat as per MDT review.**

5. **Treat the cause**
   - Prostate cancer-MDT referral
   - Prostatitis-NSAIDS, Tamsulosin, antibiotics, referral to a chronic pain clinic

**Suggested Reading**


NICE Clinical Knowledge Summary on Haematospermia.
Lower Urinary Tract Symptoms

Referral criteria

- As per NICE Guidance CG 12, 2015.
- LUTS complicated by recurrent or persistent urinary tract infection, retention, renal impairment that is suspected to be caused by lower urinary tract dysfunction, or suspected urological cancer.
- Men with stress urinary incontinence.
- Bothersome LUTS that have not responded to conservative management or drug treatment.
- Patients with failed medical therapy requiring surgical treatment options or catheterisation (ISC, SPC or urethral).

Causes

- Anatomical obstruction: Benign prostatic hyperplasia (BPH), urethral stricture, prostate cancer.
- Detrusor muscle weakness and/or instability, OAB.
- Infection: Urinary Tract Infection (UTI)/STI, prostatitis.
- Inflammation: chronic prostatitis, urethritis.
- Stones: bladder or ureteric stones.
- Cancer: prostate or bladder cancer, urethral cancer.
- Neurological disease, e.g. multiple sclerosis, spinal cord injury, cauda equina syndrome.
**History**
- Take a Focused history, AUA Guidance on BPH, 2014.
- History: IPSS score, storage symptoms: frequency, urgency, nocturia, voiding symptoms: weak strain, stream, hesitancy, terminal dribbling, quality of life.
- STIs, UTIs, haematuria (visible/none visible).
- Waking up wet at night (chronic retention-high pressure-needs a catheter immediately).
- Fevers/rigors (sepsis).
- Prior therapy or investigations-any under urology.
- Past urological history: catheters, AUR, prostate cancer, urological procedures.

**Examination**
- BP.
- Abdomen: palpable masses in flanks (renal mass), flank tenderness (stones), SPC mass (bladder mass or retention).
- Scrotal examination-evidence of epididymoorchitis, testicular or penile masses, review of external urethral meatus-size.
- Catheters-size, type (urethral/ SPC/ LTC?), colour of urine draining, debris/clots.
- DRE: size, consistency, firmness of prostate gland.

**Investigations**
- As per EAU Guidance, 2018.
- Urine analysis and culture.
- Flow rate including voided volume (difficult to interpret if less than 100 mls). Expect the curve of BPH on flow rate.
- Post void scan (less than 200 mls is acceptable).
- Renal function, if abnormal, USS KUB (review for bilateral hydronephrosis, if present or if renal function deranged, catheterise).

**Outcome**
- If BPH: Conservative management.
  - Cut out caffeine and diuretics.
  - Urethral sump milking (squeezing last few drops out of the urethra).
  - Bladder re-training.
  - Medical management: tamsulosin, finasteride or combination therapy with an anticholinergic or antimuscarinic.
- Surgical management: TURP or LTC/ISC if patient not keen on operation.
- If urethral stricture
  - Flattened trace on flowrate -book for Flexible cystoscopy/ urethrogram.
  - Book for Rigid cystoscopy +/- urethral dilation or optical urethrtomy.
Suggested Reading

AUA Guidance on Management of BPH, 2014
EAU Guidelines on None Neurogenic Male LUTS, 2018.
NICE Guidance CG 67 on Male LUTS, 2015
**Diagnosis Pathway for LUTS**

**Patient presenting with LUTS**
- **Storage** - Frequency, urgency, nocturia
- **Voiding** - Hesitancy, straining, weak stream, incomplete emptying (check not in retention)
- **Post micturition** - terminal dribbling

In history, rule out UTIS, haematuria

**IPSS score-mild or moderate**
- Examination - assess patient, check not in retention

**Conduct a flow rate**
- Normally Qmax > 13 mls/s. If Qmax < 7mls, list for TURP if failed medical therapy
- Urine dip - check for blood and nitrites

**IPSS score-severe**
- Renal function normal
- USS KUB PVR < 200 ml
- Flow rate > 10 mls/s
- Urine dip negative

**Check renal function**
- If abnormal, USS KUB for obstruction, stones, evidence of obstruction, hydronephrosis, volume of prostate, PSA

**Flow rate and PVR**
- Ensure patient is emptying and not in retention
- Urine dip negative

If patient has haematuria, with no other malignancy, UTIS, bladder stones, Renal derangement and fit for surgery, list for TURP.
- Options include mono and bipolar turp, HOLEP, Urolift.
**Fig. 13.1** MRI demonstrating large prostate with prostate cancer, protruding into bladder

**Fig. 13.2** Demonstrating normal and BPH flow rate. If a urethral stricture is present, you will see a flat line

**Fig. 13.3** BPH on cystoscopy
Suggested Reading

AUA Guidance on Management of BPH, 2014

EAU Guidelines on None Neurogenic Male LUTS, 2018

NICE Guidance CG 67 on Male LUTS, 2015


Management Pathway for LUTS-Benign Prostatic Enlargement

**LUTS Storage - Frequency, urgency, nocturia Voidsing - hesitancy, straining, weak stream, incomplete emptying Post micturition- terminal dribbling**

**LUTS Voiding - hesitancy, straining, weak stream, incomplete emptying**

**IPSS score - mild or moderate**
Renal function normal
USS KUB (estimate prostate volume) - PVR <200 ml
Flow rate >13 ml/s Q Urine dip negative

**Conservative measures**
- cut out caffeine if urgency - bladder retraining, anticholinergics, as long and PVR <200 mls and not in retention. Counsel the patient regarding PSA testing

**Medical therapy**
- 1st line - 0.4 mg Tamsulosin - side effects headache, dizziness, ED, retrograde ejaculation, decreased libido. 2nd line - tamsulosin and finasteride-5 mg po od (Maximum medical therapy) If that fails, and patient fit counsel for TURP options

**Start patient on maximum medical therapy**
Warn them that it may be like to fail, and counsel them re complications of TURP - ED incontinence, retrograde ejaculation, rectal injury, bladder perforation/repair.

**IPSS score - severe**
Renal function normal
USS KUB PVR<200 ml
Flow rate > 10 ml/s Urine dip negative

Suggested Reading

- AUA Guidance on Management of BPH, 2014
- NICE Guidance CG 67 on Male LUTS, 2015
Acute Urinary Retention

Definition
- Acute presentation to A+E.
- Pain and inability to pass urine, despite desire to do so.
- Pain in suprapubic region.
- Pain relieved by catheterisation.
- (Cathcart et al)
- Usually > 600-800mls

Causes
- NICE Evidence Summary on Acute Urinary Retention.
- Anatomical causes: Benign prostatic hyperplasia (BPH) with obstruction, Prostate cancer and enlarged prostate, urethral stricture.
- Functional causes: Detrusor muscle weakness and/or instability.
- Neuropathic causes: Spinal injury, spinal column compromise, MS.
- Infectious causes: Urinary Tract Infection (UTI)/ Prostatic abscess/ Chronic prostatitis.
- Clot retention (bleeding from urinary tract, cancer cause)
- Pelvic causes; prolapse, pelvic masses, bladder cancer.
- Medical causes, constipation, diabetes.
- Post op - instrumentation, cystoscopy, TRUS biopsy, hernia surgery, radical pelvic surgery, post GA.

History
- Catherise patient 1st - monitor residual. Note whether they are on anticoagulants or have had lower abdominal surgery, in case of difficult catheter and SPC requirement.
- History: IPSS score, storage symptoms: frequency, urgency, nocturia, voiding symptoms straining: weak strain, stream, hesitancy, terminal dribbling.
- STIs, UTIs, haematuria - if any haematuria - patient not for SPC (if cancer you can convert a localised tumour to an advanced one).
- Prior therapy, investigations. past history of retention.
- Past urological history: catheters, AUR, prostate cancer.
- As per Kirby et al.
Examination

• Monitor observations - if septic assess and treat cause.
• Abdomen: palpable masses in flanks (renal mass), flank tenderness (stones, pyelonephritis), SPC mass (bladder mass or retention)
• Scrotal examination, testis and epididymis - scrotal infection.
• Review of external urethral meatus - any discharge.
• DRE: size, consistency, firmness of prostate gland, tenderness (abcess, prostatitis).

Investigations

• Catheterise, IV antibiotics, one shot gentamicin usually.
• If septic, at least a 7 day course.
• Decompression may result in haematuria.
• Urine culture - once cultures are back, treat according to sensitivities - micro should be able to give a general indication within 24 hrs.
• Residual volume: if less than 600 mls, discharge home with OPA for TWOCK.
• If > 600 mls admit and monitor for diuresis.
• Lying and standing BP
• Renal function and USS KUB
• (EAU Guidelines on Male LUTS, 2018.)

Outcome

• Treat the cause
• If HPCR - TURP or LTC
• If AUR and PVR <800 mls, start tamsulosin 0.4 mg po od (works within 48 hours) and for TWOCK at later date. If TWOC failed, for TURP.
• If AUR and PVR > 800 mls, for TURP or LTC/ISC.
Suggested Reading


NICE Evidence Summary on Acute Urinary Retention. 2018.
Diagnostic Pathway for Acute Urinary Retention

Patient presents unable to pass urine. Pain in the SPC region and abdominal distention. Bladder scan to confirm diagnosis and patient not oliguric.

Catheterise the patient. Note the residual Haematuria may occur - decompression haematuria.

Take a full history and examine the patient including DRE. Send off bloods and urine culture. Request an USS KUB. Urine culture.

IF patient not in retention, and bladder is empty, reassess patient and refer to the appropriate speciality.

Suggested Reading


NICE Evidence Summary on Acute Urinary Retention. 2018.
Management Pathway for Acute Urinary Retention

Patient presents unable to pass urine. Pain in the SPC region and abdominal distention. Bladder scan to confirm diagnosis and patient not oliguric. Catheterise patient and note residual:

(LPCR) If Residual < 600 mls
Check U+Es and monitor lying and standing BP. Send off urine culture. Check for prior LUTS and constipation. DRE to assess for abscess/prostatitis.

If Residual > 1 L
Check U+Es, monitor for diuresis. Check bloods and conduct USS KUB.

If bloods and obs normal, discharge home. Start on 0.4 mg tamsulosin OD and treat constipation. TWWCK in 1 week. If patient goes back into retention, recatheterise and offer LTC or TURP/HOLEP/Urolift.

If renal function deranged/USS KUB shows hydronephrosis, for TURP/HOLEP/LTC. If pt diuresing (>200 ml/hr for 2 hours) start on 50% fluid replacement.

Suggested Reading


Difficult Catheters

Definition

- A catheter which does not pass smoothly and easily up the urethra (meatal, bulbourethra, prostatic and membranous urethra) into the bladder.
- Do not force catheter up the urethra - it is very easy to traumatise this region, redering the patient susceptible to urethral strictures and surgery for life.
- If a catheter is forced on an introducer, this can cause bleeding requiring emergency surgery.

Causes

- Causes of AUR.
- Benign prostatic hyperplasia (BPH) with obstruction/prostate cancer.
- Bladder stone / prostatic or urethral calculi.
- Chronic prostatitis.
- Urethral stricture, urethral flap, prior urethroplasty.
- TCC, bladder or urethra.
- Iatrogenic, post TRUS biopsy, post instrumentation.
**Urethral catheterisation**

- Keep the pt NBM and check clotting (note anticoagulants and reversal agents)
- Assess the abdomen for lower abdominal scars - enquire about haematuria (not for SPC, only for flexible cystoscopy guided catheter).
- Palpate for a palpable bladder (acute retention, volume > 600 mls needed for SPC to be safe).
- If prior attempts have been made, localise where the problem is - meatus, bulbourethra or prostate.
- Have one go at catheterisation with a LTC - 16 fr, LTC 18 fr.
- If you feel resistance don’t push move onto the next step (below)
  - (Willette et al 2012).

**Coude tip catheters**

- Catheters with a curved tip.
- Also known as Tiemanns tip.
- Purpose of curve - to negotiate urethral flaps, strictures or large prostates.
- Hold the catheter upright and glide it along the urethra - a 16 fr first.
- If you encounter obstruction, don’t push. - you could traumatize the urethra.

**Flexible cystoscopy guided catheter**

- Indication - failure of urethral catheter using either standard urethral catheters or Coude tip catheters.
- Place to do it - theatre anaesthetic room - under LA.
- Equipment: flexible cystoscopy, light source, monitor, giving set, Normal saline 500 ml bag, sensor guidewire (hydrophilic guidewire), venflon.
- Via aseptic technique, connect the light source to the flexible cystoscopy. Connect the giving set to the fluid and to the cystoscope.
- Fill the chamber and get rid of air bubbles. Prep and drape the area, instill the LA into the urethra.
- Pass the flexible cystoscopy into the bladder, then pass the guidewire, and railroad the catheter over it using the venflon.
- Monitor the residual volume post procedure.
  - (Wagner et al, Abbott et al,)

**Supra-pubic catheter**

- Assess the patient for haematuria. If present, they may have a TCC bladder - do not do an SPC.
- If there are any lower midline scars, the patient will need an open cystoscopy instead, under GA.
- Check the clotting. Make sure the patient is appropriately consented - bowel perforation, vascular damage, open surgical repair.
- Infilitrate the LA in a bleb under the skin 1-2 cm above the symphisis pubis in the midline, then down to the bladder and aspirate. Do not insert the SPC unless urine is aspirated. Attach the syringe to the spinal needle and re-insert over the LA infiltration site., aspirate as you go down. You are in the bladder if you can aspirate 10 mls of urine.
- Remove the syringe and pass the guidewire (soft tip 1st) into the bladder.
- Insert dilator and trochar over that once skin has been incised.
- Remove the dilator and guidewire, put a tube of instillagel down the trochar (gives you more time) and insert the 16 fr catheter that came with the set.
  - (Ghaffary et al)

Fig. 18.1 A Coude tip catheter

Fig. 18.2 An Introducer- usually passed down a catheter and used to insert the catheter urethrally. The curve can be used to slide the tip over the side of the bladder

Fig. 18.3 Supra-pubic catheter set


Management Pathway for Difficult Catheters

Pt in retention
Use 16 fr silastic catheter first
Look for a cause of retention

If this fails, use 18, 20, 22 coude tip or tiemanns tip.
Assess for prior haematuria - if haematuria, not for SPC.

Use either a flexible cystoscope and guidewire to railroad a catheter or a SPC if no scars on the abdomen. If scars present, patient will need an open cystostomy.

Check patients bloods including clotting give antibiotics, keep them nil by mouth

Assess the lower abdomen for scars

Suggested Reading

Chronic Retention

Definition

• Chronic presentation, very often to OPA.
• Despite voiding, patient still has full bladder, which is painless.
• Patients often deny problems.
• A very small volume would be passed (overflow) usually as dribbling.
• No pain, with a palpable bladder.
• Patient may describe difficulty voiding and waking up wet at night.
• Volume greater than 800 ml.
• (Negro et al)

Causes

• Benign prostatic hyperplasia (BPH) with obstruction.
• Prostate cancer.
• Detrusor muscle weakness and/or instability.
• Neuropathic bladder.
• Chronic prostatitis.
• Urethral/meatal stricture or phimosis stricture.
• (Chapple et al. 2013)

History

• As per NICE Guidance
• Catherise patient 1st. Patient will very often wake up wet at night.
• History: IPSS score, voiding: frequency, urgency, nocturia, straining: weak strain, stream, hesitancy, terminal dribbling, STIs, UTIS.
• Prior therapy, investigations, past history of retention, therapy.
• Past urological history: catheters, AUR, prostate cancer.
Suggested Reading


NICE Guidelines CG 97, Lower urinary tract symptoms in men: management. 2015

Diagnostic Pathway for Chronic Retention

Patient usually presents to OPD Completely pain free, with a palpable bladder and LUTS

Take a focused history including IPSS score, presence of UTIS, Haematuria Prior Surgery

Assess fitness for surgery

Ask the patient to fill their bladder and conduct flow rates-usually unable to void to empty their bladder, with poor voided volumes and poor flow rates

Note PVR

Suggested Reading


Pt in high pressure chronic retention

Attempt urethral catheter
If this fails, use 18, 20, 22 coude tip or Tiemann tip.
Assess for prior haematuria (Do not do SPC if this is the case)

Check patients bloods including clotting give antibiotics, keep them nil by mouth

Use either a flexible cystoscope and guidewire to railroad a catheter or a SPC if no scars on the abdomen. If scars present, patient will need an open cystostomy.

Assess the lower abdomen for scars

Suggested Reading


**Metastatic Spinal Cord Compression**

**Definition**
- Mobility threatening (Nair et al)
- Loss of innervation from the lumbar plexus (nerve roots) of the spinal canal below the termination (conus medullaris) of the spinal cord.
- Lower motor neurone lesion.
- First sign is acute urinary retention - if this is diagnosed, always check sensation (saddle anaesthesiae) and anal tone.
- Once catheterised, MRI immediately.

**Causes**
- As per NICE Guidance
- Tumour: compression from metastatic prostate cancer - maybe in multiple vertebrae.
- Trauma - fracture of vertebral bodies, destabilisation of the spinal column and compression.
- Spinal canal stenosis, lumbar disc protrusion.
- Infection, bleeding.
- Demyelinating conditions - MS.
- AV Malformation.

**History**
- History: IPSS score, LUTS. Back pain. UTIS. Mobility issues.
- Saddle anaesthesiae, sciatic pain.
- AUR - if so for how long - acute or chronic? Any problems or recurrent episodes of retention before?
- History of tumour, trauma, neuropathy (motor or sensory), sexual dysfunction.
- Try to localise spinal and neuropathic level - sensory and motor issues.
- Mobility - extent and duration of problems - gait disturbance.
- (Sun et al)
Examination

- Full neurological exam - upper and lower limbs and cranial nerves - reduced reflexes
- Abdomen: palpable masses in flanks (renal mass/ hydronephrosis), flank tenderness (stones), SPC mass (bladder)
- Scrotal examination, review of external urethral meatus.
- DRE: anal tone, sensation, saddle anaesthesiae.
- Keep on bed rest.
- (Sun et al)

Investigations

- MRI spine - delineate level and extent of compression - assess the vertebrae above and below
- Bed rest and TEDS (neurosurgeons may request flowtrons/ heparin if for surgery). If a patient is on bed rest - increased risk of DVT formation.
- Dexamethosone 8 mg PO BD and a PPI
- Bloods including clotting and group & save
- Keep pt NBM in case of surgery.

Outcome

- Inform oncology and neurosurgeons of the MRI result.
- If the vertebrae above and below the compression are free of disease and the patient is fit, neurosurgery will decompress the spinal cord and plate this.
- If there is disease present above and below, then referral to radiation oncology is needed, where the patient will go for radiation therapy everyday for one week.
- Keep patient on bed rest with TEDS.
- Once decompressed/ treated with radiation therapy, start rehabilitaiton and make sure the cause is treated.

Suggested Reading


Patient is admitted 'off legs.'

Take a focused history from patient and relatives. Is there any history of prostate cancer, or any underlying medical conditions that could compress the spinal cord?

Assess patient neurologically, including anal tone and sensation, and conduct a DRE - is it prostate cancer? Also assess for saddle anaesthesia. Assess for a bladder mass - if in retention catheterise.

Keep the patient NBM
Keep the patient on bedrest with TEBS/Flowtrons, Check the PSA. Look for a cause of spinal cord compression.
Suggested Reading


Management Pathway for Metstatic Spinal Cord Compression

MRI Spine confirms spinal cord compression
Keep patient on Bedrest with flowtrons and heparin
Start dexamethasone 8 mg PO BD and a PPI

Speak to neurosurgery, if there is no disease in the vertebrae above or below, neurosurgery will fix the spine and decompress the lesion. Let them know the plan for dalteparin, and they will advise you what will be best with their surgery and time of surgery.

If neurosurgery say no to surgical decompression, speak to radiation oncology. Treatment is a dose of radiation once a day to the affected region for 5 days.

Suggested Reading


Urethral Strictures

Definition
- Narrowing of the urethra.
- The urethra is composed of bulbo-urethra, prostate and membranous urethra.
- Impairs urinary flow resulting in LUTS, spraying or splitting of the stream.
- Patient will often describe having to strain passing urine, and slow emptying, with a residual volume.
- Patients may also present in retention of urine.

Causes
- Infection - UTTS, STIs.
- Urethritis - non infectious.
- BXO.
- Trauma - blunt or penetrating.
- Post cystoscopy/instrumentation.
- Pelvic fracture disrupting the urethra.
- Post hypospadias repair.
- (Latini et al)

History
- History: IPSS score, LUTS (Storage and voiding symptoms), back pain.
- Spraying.
- Urinary frequency, urgency.
- Dysuria.
- Recurrent urinary tract infection.
- Inability to completely empty the bladder.
- Retention, weak stream, straining.
- (Mundi et al, Oelke et al)
Examination

- Abdomen: palpable masses in flanks (renal mass/hydronephrosis), flank tenderness (?stones), SPC mass (bladder-retention or tumour).
- Scrotal examination, review of external urethral meatus, ?stenosis, check for phimosis, assess and make sure it is not a penile cancer causing obstruction (mass in body or glans).
- DRE: size of prostate, consistency.

Investigations

- Identify it prior to retention.
- Urine analysis/culture.
- Uroflowmetry.
- Post void residual.
- Renal function, if abnormal USS KUB (look for hydronephrosis).
- Flexible cystoscopy-review position of stricture.
- Urethrogram.
- Oelke et al.

Outcome

- Decompress bladder if in retention-catheterise for at least 3 days post procedure, then weekly ISC. Use S dilators or an SPC if no haematuria.
- Await the urethrogram to delineate length and anatomy of the stricture.
- Short strictures-us S-dilators, hegarty dilators, or cluton sounds to open up urethra or optical urethrotome.
- Long strictures should be referred to the appropriate centre for urethroplasty.
- AUA Guidelines on male urethral strictures.

Suggested Reading

Diagnostic Pathway for Urethral Strictures

Patient presents with difficulty passing urine

Focused history and examination—any prior history of BXO, surgery
Any prior history of urethral dilation, optic urethrotomy or reconstruction?

Flow rate and PVR—if in retention, decompress bladder
Urine dip and culture
USS KUB—look for other pathology
Flexible cystoscopy—look for bladder pathology and stricture
Urethrogram to assess length
**Fig. 27.1** Demonstrating a urethral stricture in a male—you can see the prostate behind the stricture

**Fig. 27.2** Figure demonstrating sites of urethral stricture

**Sites of Inflammatory Strictures**

**Distribution of Paraurethral Glands**
Fig. 27.3  Demonstrating sites of iatrogenic injury

Fig. 27.4  Urethrogram demonstrating a urethral stricture
Suggested Reading


Management of Urethral Strictures

Patient with proven stricture - decompress bladder if PVR > 400 mls

If short stricture in male - consider urethral dilation, optical urethrotomy or dilation with S dilators

If short stricture in female (rare) consider using Hegarty female dilators (short curved female dilators) or Canely Riles (Short straight female dilators).

If long stricture, assess with urethrogram and refer to centre for reconstruction

Can be done as single stage or two stage urethroplasty

If not voiding and unable to pass urethral catheter, first try Flexible cystoscope and guidewire. If that fails, SPC then optical urethrotomy at a later date

Suggested Reading


Nocturnal Polyuria

Definition

- Passing large volumes of urine at night.
- Greater than 1/3rd of 24 hours output. (Madersbacher et al)
- Bladder diary (input, output, urgency, volume voided) required for diagnosis-mandatory.

Causes

- Diuretic medication.
- Caffeine related substances.
- Alcohol (diuretic).
- Excessive fluids before bedtime.
- Small bladder.
- Fluid redistribution from medical co-morbidities-DM, DI, Hypertension, CCF.

History

- History: IPSS score (storage and voiding symps), LUTS. Back pain.
- Fluid intake and caffeine consumption.
- Medical co-morbidities: diabetes, SIADH.
- Nocturia and bladder diary with volume voided and at what time.
Examination

- Abdomen: palpable masses in flanks (renal mass/ hydronephrosis), flank tenderness (stones), SPC mass (bladder).
- Scrotal examination, review of external urethral meatus.
- DRE: prostate size and consistency.

Investigations

- Urine analysis-to review for infection (nitrites) and blood.
- Urine culture.
- Bladder diary, input, output and urgency.
- Uroflowmetry - check the maximum and average flow rate, voided volume.
- Post void residual.

Outcome

- Behavioural modification-restrict fluid intake, no fluids after 6 pm, cut out caffeine.
- Review the bladder diary in detail. Look at the number of voids, the frequency, how much are they passing, small volumes or larger volumes?
- Medical therapy-
  - First line anticholinergic therapy.
  - Second line: a diuretic earlier in the day.-to reduce nocturnal polyuria.
  - Third line: desmopressin ( Drops the sodium-check sodium levels first ).

Suggested Reading


Diagnostic Pathway for Nocturnal Polyuria

Patient seen in OPD with LUTS and nocturia

Take a focused history including LUTS (IPSS). Fluid consumption, medical co-morbidities: diabetes, lung cancer, and bladder diary

Urine analysis, Urine culture Uroflowmetry and PVR. Flexible cystoscopy to assess bladder USS KUB to assess for other pathology

Bladder diary is the key to making this diagnosis-35% of urinary output passed overnight

Suggested Reading

Management Pathway for Nocturnal Polyuria

Pt with >30% urine voided at night, (excluding the void before sleep and including the first void of the morning)

- Assess patient not diabetic-
  - check fasting blood glucose

- Check no SIADH syndrome-CXR to rule out lung cancer

- Behavioural modification and first line medical therapy- anticholinergic

- Give diuretic at 11 am (Second line therapy)

- Third line medical therapy-desmopressin

Check Na

Suggested Reading


Dysuria

Definition

- Pain/burning during urination.
- May also be associated with other symptoms e.g. LUTS.
- Often the result of urinary stasis and infection as a result of that.
- Bacturia is the presence of bacteria in the urinary.
- With the UTI, there are $10^5$ colony forming units on a culture plate (Johansen et al).
- Look for an anatomical, obstructive or infectious cause.

Causes

- Urinary tract obstruction: Bladder outflow obstruction-BPH, prostate cancer, urethral stricture, obstructing stone.
- Infections: UTI, cystitis, prostatitis, urethritis, pyelonephritis, STIS.
- Stones: Renal stones, ureteric or bladder, prostatic calculi.
- Schistosoma, trichomonas.
- Neoplasia: Bladder cancer, prostatic cancer, urethral cancer.
- Vesico-ureteric reflux.
  - (Michels et al)

History

- History: IPSS score, LUTS.
- Urinary frequency, urgency.
- Dysuria-extent and duration, STIs.
- Recurrent urinary tract infections.
- Inability to completely empty the bladder.
- Retention, sepsis, fevers, rigors, abdominal pain.
- Prior treatment-antibiotics, imaging.
  - (Naber et al)
Examination

- Abdomen: flank tenderness (stones), palpable bladder (retention), ?bladder mass.
- Scrotal examination, review of external urethral meatus.
- DRE: anal tone, sensation.

Investigations

- Urine analysis/culture-check past cultures.
- Uroflowmetry.
- Post void residual.
- USS KUB/ CT KUB if stones suspected-look for stones obstructing the urinary system needing either stent or nephrostomy.
- Unobstructing stones can also cause infections and dysuria.
- Renal function.
- Flexible cystoscopy-to rule out bladder tumour, bladder stones.
  (Naber et al)

Outcome

- If recurrent UTIS-consider lifestyle measures, and a low dose of prophylactic antibiotic.
- If stones-make sure patient is not obstructed and follow stones pathway-definitive treatment for stone may be ESWL, ureteroscopy or PCNL.
- If LUTS from BPH, medical therapy as 1st line, then surgical management.
- If bladder tumour, book for TURBT if fit for surgery-bladder tumour pathway.
- IF Prostate cancer-follow prostate cancer pathway.
**Fig. 32.1** Urine dip sticks

**Suggested Reading**


Diagnostic Pathway for Dysuria

Patient with dysuria in OPD

Take a focused history including LUTS, extent and duration of symptoms, STIs / UTIS/ sepsis, fevers, rigors, abdominal pain

Abdomen: flank tenderness (stones), palpable bladder (retention or bladder mass). Scrotal examination- epididymo-orchitis, review of external urethral meatus.

DRE: anal tone, sensation.

Suggested Reading


Management Pathways for Dysuria:
Recurrent UTIS

Patient presents with recurrent UTIS >2 in 6 months for a female, 1 or more in a male (complicated UTI)

Focused history and examination- LUTS, IPSS Score, UTIs-extent/ duration, STIs, stones, abdo pain, retention

Conservative management- rehydrate, avoid baths, vaginal douching, spermicidal agents. Over the counter cranberry tablets.

Urine dip/ Culture
Flow rate and PVR
USS KUB/ CT KUB if stones
Flexible cystoscopy-review bladder

Medical therapy
A low dose of prophylactic antibiotic as per culture

Suggested Reading


Sepsis

**Definition**
- Sepsis - the body's reaction to infection.
- The underlying pathology is one of organ hypoperfusion, hypotension and increased vascular permeability.
- Severe sepsis - sepsis strong enough to cause SIRS.
- Septic shock - shock caused by hypoperfusion of organs.
- (Singler et al)

**Causes**
- Urological sources of sepsis
- Urinary tract infections, pyelonephritis, cystitis.
- Stones/Obstructive stones-usually with associated hydronephrosis.
- Perinephritis abscess, pyonephrosis, renal abscess, pelvic abscess/collection.
- Ureteral obstruction-tumour, stones, external compression.
- Bladder outflow obstruction, retention.
- Multiple attempts at catheterisation.
- Moore et al.
Examination
- Look for the cause of sepsis.
- Assess via an ABCDE approach.
- Note capillary refill time and observations.
- Assess chest for respiratory causes.
- Assess abdomen—obstructing stones, retention, post op, GI cause of sepsis.

Investigations
- IV access x2, widebore.
- Get antibiotics in early and start fluid resuscitation.
- Bloods including FBC, U+Es, CRP, LFTs, clotting, G+S.
- Blood cultures, urine culture.
- ABG for lactate.
- CT scan.

Outcome
- Get patient to ITU/HDU.
- Management definitive problem causing sepsis.
- If obstructing stone, nephrostomy.
- If in retention, catheterise.
- Strict fluid balance.
- Daily microbiology review.
- (Cawcutt et al)

History
- Sepsis—duration, fevers, rigors.
- LUTS: Urinary frequency, urgency, nocturia, terminal dribbling, strain, weak stream, incomplete emptying.
- Pain-abdominal.
- Dysuria—extent and duration.
- Recurrent urinary tract infection, stones, BOO.
- Inability to completely empty the bladder.
- Prior treatment—antibiotics, imaging.
- LTC—last change.
Suggested Reading


 Diagnostic and Management Pathway for Sepsis

### Suggested Reading


Acute Pyelonephritis

Definition

- Infection of the renal pelvis and renal parenchyma.
- Look for an underlying urological cause.
- Is the patient obstructed?
- Are there stones?
- Are they in retention?
- Do they have a long term catheter?
- Is there a TCC in the ureter?

Causes

- Common causes: E.coli, Proteus, Klebsiella, Enterococcus. (Prabhu et al)
- Risk factors: structurally abnormal urinary tract, obstruction, (BPH, prostate cancer), renal stones, instrumentation, foreign bodies e.g. stents, pregnancy, diabetes, immunosupresion, neuropathic bladder.
- Ascending: Bladder outflow obstruction-BPH, + prostate cancer, urethral stricture.
- Descending: stones, PUJO (obstruction).
- UTI, Cystitis, prostatitis, urethritis, pyelonephritis, STI, renal stones, ureteric or bladder stones.
Examination
- Abdomen: flank tenderness (stones), palpable bladder (retention), ? bladder mass.
- Scrotal examination, review of external urethral meatus.
- DRE: anal tone, sensation.

Investigations
- Urine analysis/ culture.
- Uroflowmetry-is the bladder draining.
- Post void residual-do they have a stricture preventing bladder drainage.
- USS KUB/ CT KUB if stones suspected.
- Renal function-do they have an obstructive uropathy.
- Flexible cystoscopy-bladder stones or an tumour-do if blood on dip.
- (EAU Guidelines)

Outcome
- Decompress bladder if in retention-catheterise for at least 3 days.
- If stones and obstructed-decompress system with nephrostomy or stent, then definitive stone management later-PCNL or URS.
- If LUTS and in retention and > 1L drained, for TURP.
- If bladder stone-put patient on abx and catheterise, stone punch to extract.
- Identify and treat diabetes.
Chronic Pyelonephritis

**Definition**

- Long standing (> 3 months) Infection of the renal pelvis and renal parenchyma causing inflammation and fibrosis.
- Continuing pyogenic infection of the kidney.
- It can cause renal scarring (upper pole typically) which may result in CKD and ESRF requiring transplant.

**Causes**

- Common causes: E.coli, Proteus, Klebsiella, Enterococcus.
- Risk factors: structurally abnormal urinary tract, VUR, obstruction, (BPH< prostate cancer), renal stones, instrumentation, foreign bodies e.g. stents, pregnancy, diabetes, immunosupresion, neuropathic bladder.
- Ascending: bladder outflow obstruction-BPH, prostate cancer, urethral stricture.
- Descending: stones, PUJO (obstruction).
- Infective causes: UTI, cystitis, prostatitis, urethritis, pyelonephritis, STI, renal stones, ureteric or bladder stones.
Examination

- Abdomen: flank tenderness (stones), palpable bladder (retention), ? bladder mass.
- Scrotal examination, review of external urethral meatus.
- DRE: anal tone, sensation.

Investigations

- Obs-is there high blood pressure? - intrinsic renal disease.
- Urine analysis/ culture-is pyuria present?-an indication of infection.
- Uroflowmetry.
- Video urodynamics for neuropathic bladder
- Post void residual - are they emptying
- USS KUB/ CT KUB if stones suspected or pyonphrosis
- Renal function (CKD), HB (anaemia)
- MAG 3 renogram to review split renal function/ DMSA for static renal function

Outcome

- Appropriate antibiotic therapy as per culture, in most hospitals, give gentamicin.
- IV access, fluids
- Catheter to drain bladder and monitor urine output.
- Treat the cause-if obstructed, drain bladder, if stones, treat stones.
- CKD-admit an get nephrology review.
- Control diabetes.
Suggested Reading


Diagnostic Pathway for Pyelonephritis

Patient presents with flank pain and dysuria

Focused history and examination - prior history of pyelonephritis, any obstructive urological cause - AUR, stones, any other GU infection. Predisposing factors - diabetes, immunosuppressed?

Look for a cause
- If flank pain - CT KUB for stones
- If neuropathic bladder - video urodynamics to see how pt is emptying

Urine dip and culture
- USS KUB for stones, hydronephrosis, post void residual
- Bladder scan to ensure pt is emptying, if not, catheterise
- Check bkds inc FBC, CRP, U+Es

If obstructive stone in ureter/renal pelvis, CT KUB and if hydronephrosis, nephrostomise
- If stone present but no obstruction but renal function normal, do a MAG renogram

Fig. 39.1  CT demonstrating severe acute bacterial pyelonephritis
Suggested Reading


Management Pathway for Pyelonephritis

Confirmed diagnosis on urine dip-nitrates on dipstick and patient has clinical signs, flank pain and fever.

- Urine dip and culture, USS KUB for stones, hydronephrosis, post void residual. Bladder scan to ensure pt is emptying, if not, catheterise. Check bids inc FBC, CRP, U+Ees

- Do bladder scan, if > 400 mls-catheterise CT KUB-if obstructing stone-stent or nephrostomise. If bladder stone-put patient on abx, check PVR.

- If obstructive stone in ureter/renal pelvis, CT KUB and if hydronephrosis, nephrostomise. If CKD, monitor renal function and refer to nephrology.

- If diabetic on fasting glucose, refer to endocrine and start with diet control, monitor BMs.

Suggested Reading


Cystitis

Definition

- Infection and inflammation of the urinary bladder.
- Uncomplicated—in the presence of a structurally normal urinary tract
- Complicated—presence of infection in the male urinary system, or in an anatomically abnormal urinary tract
- Patients often present with recurrent episodes, requiring treatment.

Causes

- (Colgan et al)
- Intercourse
- Short urethra
- Recurrent UTIS
- Bladder stones
- Diabetes
- BOO
- Diaphragm contraceptive
- Poor hygiene
- Presence of foreskin
- LTC
History

- History: sexual history, LUTS.
- Abdominal / SPC pain.
- Urinary frequency, urgency, haematuria (look for malignancy).
- Dysuria-extent and duration.
- Recurrent urinary tract infection.
- Inability to completely empty the bladder-LTC.
- Retention, stones.
- Prior treatment-antibiotics, imaging, surgery.

Examination

- Abdomen: flank tenderness (stones) or masses, palpable bladder (retention), ? bladder mass.
- Tenderness in supra-pubic region-cystitis?
- Scrotal examination, review of external urethral meatus.
- Catheter size gauge, colour of urine, blockages, last changed. Position-urethral or SPC.
- DRE: size and consistency of prostate, volume.

Investigations

- Urine analysis/ culture.
- Uroflowmetry-check bladder is emptying.
- Post void residual-check < 200 mls.
- USS KUB/ CT KUB if stones suspected.
- Renal function.
- Flexible cystoscopy-look for hunners ulcers and glomerulations, signs of interstitial cystitis, look to exclude malignancy.

Outcome

- Treat infections according to sensitivity results.
- Put patient on empirical antibiotics until cultures come through.
- Correct surgical/ anatomical causes e.g. surgery for VUR, BOO.
- Encourage oral intake of water.
- OTC cranberry tablets or hiprex.
- Make sure patient has good hygiene measures.
- Ensure LTCs are in the correct position and draining properly.
Suggested Reading


Diagnostic Pathway for Cystitis

Patient presents with suprapubic pain, fever and dysuria

Focused history and examination-prior history of cystitis, prior diagnosis and treatments, any obstructive uropathy. Any predisposition to infection-diabetes, immunosuppression. Look for anatomical abnormalities/surgical causes.

Urine analysis/ culture-look for infection
Uroflowmetry.
Post void residual-are they emptying their bladder?
USS KUB/ CT KUB if stones suspected. Renal function.
Flexible cystoscopy-bladder pathology, stones tumour.

Suggested Reading


Management Pathway for Cystitis

**Confirmed diagnosis on urine dip-nitrates on dipstick and patient has clinical signs, suprapubic pain, dysuria and fever**

- Do bladder scan, if > 400mls-catheterise
- USS KUB-to rule out stones, bladder masses
- Send off MSU

- Check blds inc FBC, CRP, U+Es
- Send off blood cultures
- If septic, blood gas and critical care outreach review

- Start on antibiotics as per trust protocol
  - Usually gentamicin
  - IV fluids
  - Daily fluids
- Monitor observations and UO

- Flexible cystoscopy when episode treated—look for interstitial cystitis—refer for gelpan therapy
- Surgery for anatomical causes

**Suggested Reading**


Pyonephrosis

Definition
- A collection of white bloods cells, pus and bacteria in the collecting system.
- Main factors causing it: bacteria in the upper urinary tract and obstruction.
- Risk factors: immunosuppression, diabetes, abnormal urinary tract anatomy (horseshoe kidneys, stones, transplant kidney, malignancy).
- Pyonephrosis requires immediate drainage with either ureteric stent or nephrostomy.

Causes
- Causes: ascending infections from bladder, E. Coli, Klebsiella, Proteus, Candida.
- Colonisation of LTC.
- BOO.
- Post surgery, cystoscopy, ureteroscopy or PCNL.
- Hydronephrosis.
- Anatomically abnormal urinary tract, obstructive stone.
- (Sow et al)
**History**
- History: LUTS, urinary tract obstruction.
- Nausea and vomiting.
- Urinary frequency, urgency, incomplete emptying.
- Dysuria: extent and duration.
- Fever, chills, flank pain.
- Prior treatment: antibiotics, imaging.
- Immunosuppression, diabetes.
- (EAU Guidelines)

**Examination**
- Review for sepsis.
- Abdomen: flank tenderness (stones), palpable flanks/back mass (abcess), palpable bladder (retention),? bladder mass.
- Scrotal examination, review of external urethral meatus.
- DRE: Size, consistency and volume of prostate, anal tone, sensation.

**Investigations**
- ABCDE approach
- IV line
- IV abx: Usually gentamicin if no renal impairment
- Fluid resuscitation
- Urine analysis/culture
- Catheter and strict fluid balance
- Bloods in FBC U+Es and clotting CRP, ABG
- CT KUB

**Outcome**
- Nephrostomy or stent insertion under IV abx cover
- ITU/HDU care
- MAG 3 renogram at a later date: kidney may become non-functional and require nephrectomy later on
Suggested Reading

45 Diagnosis of Pyonephrosis

Fig. 45.1 CT demonstrating pyonephrosis
Suggested Reading

Management Pathway for Pyonephrosis

CT scan confirms pyonephrosis

A, B, C approach IV lines, IV abx then fluids, Urine analysis/ culture-catheter and strict fluid balance

Nephrostomy or stent insertion under IV abx cover ITU/ HDU care Strict fluid balance

Check Bloods in FBC U+Es and clotting CRP, ABG CT KUB

Once patient recovered, MAG 3 renogram-kidney may become none functional and require nephrectomy

Suggested Reading

Perinephric Abcess

Definition

- A collection of pus in the perinephric space.
- It can rupture through the fascia to become a paranephric abcess.
- Patients often present as critically sick into A+E.
- This is a condition that must be managed quickly and efficiently
  - (Meng et al)

Causes

- Common causes: E.coli, Proteus and Staph, Klebsiella, Proteus, Enterobacter, Pseudomonas, serratia.
- Urinary tract obstruction or spread from blood
- Perforation of urinary system-post instrumentation
- Risk factors: structurally abnormal urinary tract, obstruction, (BPH, prostate cancer), renal stones, instrumentation, foreign bodies e.g. stents, pregnancy, diabetes, immunosupresion, neuropathic bladder.
- Ascending: bladder outflow obstruction-BPH, prostate cancer, urethral stricture.
- Descending: stones, PUJO (obstruction).
- UTI, Cystitis, prostatitis, urethritis, pyelonephritis, STI, renal stones, ureteric or bladder stones.
  - (Gardiner et al)
History
- Fever, rigors
- Flank or abdominal pain
- Nausa, vomiting,
- Dysuria, UTI
- Weight loss, lethargy.
- Ileus, pleuritic pain or referred pain to the groin, thighs or knees

Examination
- Observations-Sats, RR, BP HR, Capillary refill time.
- Abdomen: flank tenderness (stones), flank mass, pelvic abcess, peritonitis.

Investigations
- A, B, C, D, E approach.
- IV lines.
- IV abx then fluids.
- Urine analysis/ culture-catheter and strict fluid balence.
- Bloods in FBC U+Es and clotting CRP, ABG.
- CT IVU.

Outcome
- If no blood dyscrasias, insert a percutaneous nephrostomy.
- Send off pus for culture from nephrostomy.
- ITU/ HDU care.
- IV antibiotics, usually Tazocin and Gentamicin.
- Give antibiotics according to culture sensitivity results.
- Strict fluid balence and resuscitation.
- (Meng et al)
Suggested Reading

Diagnostic Pathway for Perinephric Abcess

Patient presents generally unwell, with flank pain, fever, and rigors.

Focused history including fever, flank or abdominal pain, Rigors, Dysuria, Weight loss, lethargy, history of immunosuppression, diabetes, or obstructive uropathy/obstruction of the urinary tract.

- Keep patient monitored in ITU/HDU review
- Catheterise
- Strict fluid balance

Observations: Sats, RR, BP HR, Capillary refill time.
- Abdomen: flank tenderness (stones), flank mass, pelvic abscess, peritonitis

CT with contrast.
- Send off blood and urine cultures
- Bloods including clotting
- Keep pt NBM

Fig. 48.1 CT demonstrating perinephric abcess
Suggested Reading

Management Pathway for Perinephric Abcess

Patient diagnosed with perinephric abcess on CT with contrast

Keep NBM
Check bloods including clotting
Give IV abx and keep on IV abx and fluids for a minimum of 14 days- discuss with microbiology.

If abcess > 1 cm, drain with a nephrostomy, if not blood dyscrasias-drain is usually removed after a repeat CT with contrast demonstrating resolution of abcess. ITU/HDU care

If abcess < 1 cm, treatment is IVAbx and fluids, with monitoring of UO and daily bloods, daily micro review.

If abcess has affected whole kidney, such that the kidney is a collection, consider nephrectomy. (Pt will most likely be very septic).

Suggested Reading

Necrotising Fasciitis

Definition
- Infection of the skin and subcutaneous tissues.
- Life threatening—expedite surgical debridement.
- Spreads via the fascial planes.
- Commonly gas forming organisms
- Occurs often in diabetic patients.

Causes
- Common organisms include Group A Streptococcus (group A strep), Klebsiella, Clostridium, Escherichia coli, Staphylococcus aureus, and Aeromonas hydrophila.
- Group A strep is considered the most common cause of necrotising fasciitis.
Examination
- Abdomen and perineum:
  - Area of skin discolouration (mark area)
  - Necrosis
  - Crepitus (air beneath skin)
  - Palpable bladder
  - Scrotal examination, review of external urethral meatus.

Investigations
- Simultaneous assessment and management
- Observations, if unstable, keep in A&E resusc and get ITU involved early
- A-sats (get oxygen on) B RR (nebs if required, mobile CXR), C-well perfused peripherally? peripheral pulses? or shut down?
- Lines in and IV fluids and abx-gentamicin, co-amoxiclav and metronidazole.
- Abdomen: flank tenderness (stones), palpable bladder (retention), ?bladder mass> CT.
- Look for other causes-rigid abdomen-? bowel perforation.
- Scrotal examination, review of external urethral meatus-examine for fournieres gangrene-catheterise.
- DRE: anal tone, sensation.

Outcome
- Keep patient NBM
- IVI access, IV abx-according to trust policy-gent, metro and taz usually
- Fluid resuscitate and catheterise-strict fluid balance
- List for theatre-debridement, +/-stoma +/-orchidectomy
- (Inform General Surgery and Plastics for reconstruction or stoma, Inform microbiology for tissue sample from theatre).
- Anaesthetic assessment quickly and take patient to theatre
- (Czymek et al)

History
- Often starts as a small superficial infection area of infection but spreads within minutes.
- Tracks along the fascial planes.
- Fever, rigors,
- Acute onset, may have a history of minor trauma
- Urinary symptoms: LUTS, LTC, recurrent infections-prior history of infection and failed treatment with antibiotics.
- May have symptoms of being generally unwell.

History
- Often starts as a small superficial infection area of infection but spreads within minutes.
- Tracks along the fascial planes.
- Fever, rigors,
- Acute onset, may have a history of minor trauma
- Urinary symptoms: LUTS, LTC, recurrent infections-prior history of infection and failed treatment with antibiotics.
- May have symptoms of being generally unwell.

History
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- Fever, rigors,
- Acute onset, may have a history of minor trauma
- Urinary symptoms: LUTS, LTC, recurrent infections-prior history of infection and failed treatment with antibiotics.
- May have symptoms of being generally unwell.

History
- Often starts as a small superficial infection area of infection but spreads within minutes.
- Tracks along the fascial planes.
- Fever, rigors,
- Acute onset, may have a history of minor trauma
- Urinary symptoms: LUTS, LTC, recurrent infections-prior history of infection and failed treatment with antibiotics.
- May have symptoms of being generally unwell.
Suggested Reading


Diagnostic Pathway for Necrotising Fasciitis

Patient may come in looking relatively well, but give a history of prolonged epididymo-orchitis or obstructive uropathy

History—generally unwell, fevers, rigors, LUTS, difficulty emptying the bladder, may also report pain and tender scrotum with blackness of skin

Get urgent CT to see extent and degree of spread
Send off bloods including clotting and group and save.

Examination—abdomen and genitalia. Look for areas of erythema, abnormal skin discolouration and skin crepitus (air tracking along the fascial planes)—look to see if the perineum/anus is involved

Inform General Surgery oncall consultant and Plastics consultant, regarding formation of stoma, if infection has tracked to perineum and plastics for grafting at a later date.

Fig. 51.1 USS demonstrating air within the scrotal tissues—necrotising fasciitis
Suggested Reading


Management Pathway for Necrotising Fasciitis

Patient clinically presents with necrotising fasciitis confirmed on CT

- Keep NBM
- Check bloods including clotting
- Give IV abx and keep on IV abx and fluids
- Catheterise patient

Inform microbiology to expect a tissue sample from theatre for culture.
- Keep on antibiotics
- ITU/HDU care

Get patient to theatre urgently with general surgery for debridement +/- fashioning of stoma

Take patient to theatre for a second look 24 hours later
- Once patient has fully recovered from initial infection, consider grafting

Suggested Reading

Scrotal Abscess

Definition
- Collection of pus within the scrotum.
- Can be superficial and ‘tent’ the scrotal skin.
- Deep infections within the scrotum (testicular) can also result in deep seated abcess.
- Check for underlying testicular tumours (Arias-Cameron).
- It can also mimic torsion (Toh).

Causes
- Epididymitis, if necrotising.
- Testicular abcess.
- Delayed torsion.
- Testicular Tumour.
- Patent processus vaginalis and appendicitis.

History
- Painful area, with no relief, often fluctuant having increased in size.
- Features of abcess: Calor-warmth, Rubor-redness, Dolor-pain, Tumour-mass.
- Fevers/ rigors/ LUTS/ UTIS.
- History of recurrent abcesses, or diabetes, post surgery.
- An USS is require for diagnosis (Miskin).
Examination

- Abdomen and perineum: area of skin discoloration (mark area),
- Erythema, swelling, redness present.
- Fluctuant lesion, tender to touch.
- Check no crepitus present (necrotising fasciitis)
- Assess the abdomen, tender in RIF? appendicitis, palpable bladder?

Investigations

- Urine analysis and culture.
- Bloods: FBS, clotting renal function and LFTS.
- Pus swab if abscess burst.

Outcome

- Keep patient NBM, give IV abx.
- Take patient to theater for incision and drainage of abscess.
- Use a yates drain to keep the abscess open-remove on the ward the next day.
- Scrotal abscesses are superficial and do not normally require packing.

Suggested Reading


Diagnostic Pathway for Scrotal Abcess

Patient presents with painful, fluctant discharging area on scrotum

History-extent and duration, increase in size, discharge or pus, fevers, rigors or LUTS

Keep NBM. Give IV abx. Get an USS Testes. Give pain relief

History of recurrent abscesses, or diabetes, post surgery, history of hidradenitis suppurativa

Fig. 54.1 Demonstrating an USS of the scrotum with a scrotal abcess

Suggested Reading


Management Pathway for Scrotal Abcess

USS testes confirms scrotal abcess, and no testicular tumour

Keep NBM
Check bloods including clotting
Give IV abx and keep on IV abx and fluids
If no palpable area to incise, treat with IVabx (abcesses usually <1cm).

If palpable,
Get patient to theatre urgently for incision and drainage of abcess
Take pus swab during procedure
If a deep abcess, insert a Yates drain.

Patient should have Yates drain removed the next day and be sent home.
Check blood glucose prior to discharge

Check for updates
Epididymitis/Orchitis

Definition

- Infection within the scrotum result in inflammation of the epididymis, testicle or both together.
- This can be acute, chronic or acute on chronic.
- Acutely painful when it does occur.
- In patients with a painful testicle < 20 years, rule out torsion with surgical exploration.

Causes

- In sexually active: chlamydia, gonnorrhoea or E.Coli.
- Urinary tract organisms: E.coli, Proteus, Klebsiella.
- Post operation: cystocopy, prostatectomy, vasectomy.
- Inflammatory non infectious causes: reflux of urine, chemical epididymitis-amiodarone.
- Post catheterisation.
- Differentials: testicular torsion, testicular tumour, hernia, lipoma of the cord, hydrocoele
- (Stewart et al)
Epididymitis/Orchitis

History

- Painful, red, hot swollen testicle.
- May have an associated UTI or LUTS with incomplete emptying.
- Gradual onset of pain, developing over days.
- Check for LTC.
- Associated frequency and urgency.
- Urethral discharge.
- History of recurrent infection, or diabetes, post surgery or catheterisation.
- (Naber et al)

Examination

- Abdomen and perineum: check for fouriers gangene-area of skin discolouration (mark area), necrosis, crepitus (air beneath skin).
- Scrotal skin change in longstanding cases-induration, tenting of skin (abcess), localised fluctuant area (infected sebaceous cyst).
- Scrotal examination, review of external urethral meatus-red hot swollen testicle, normal lye, non high riding. cremasteric reflex present.

Investigations

- Simultaneous assessment and management
- Urine culture.
- If septic, blood cultures.
- IV line access.
- Bloods: FBC, CRP, Renal function.
- USS scrotum-to rule out abcess or tumour.
- (Hebener et al)

Outcome

- IVI access, IV abx-according to trust policy-gent, metro and taz usually.
- Fluid resuscitate and catheterise-strict fluid balance.
- Treat with antibiotics for 14 days, give a scrotal support.
- If severe and changed to fouriers gangrene, resuscitate and list for debridement +/- stoma +/- orchidectomy in theatre.
Suggested Reading

Diagnostic Pathway for Epididymo-Orchitis

Patient clinically presents with tender swollen testicle and fever

- History: extent, duration, UTI/STI or LUTS. Prior treatment
- Recurrent epididymoorchitis? History of diabetes, immunosuppression or catheterisation?
- Scrotal examination—look for red hot swollen testicle. Prehn’s sign positive—when you lift the testicle, the pain gets better
- Do an USS Testes

Examine abdomen and perineum for gangrene, necrosis, crepitus/Scrotal skin change in longstanding cases—induration, abscesses or infected scrotal cyst

Suggested Reading

Management Pathway for Epididymo-Orchitis

USS testes confirms epididymo-orchitis

Check bloods including clotting
Give IVabx and keep on IVabx and fluids
Bladder scan-if PVR > 400 ml catheterise pt

If severe and changed to fouriers gangrene, resuscitate and list for debridement +/- stoma +/- orchidectomy in theatre

IVI access, IV abx- according to trust policy- gent, usually
Fluid resuscitate and strict fluid balence

Treat with antibiotics for 14 days, give a scrotal support

Suggested Reading


Prostatitis

**Definition**
- Inflammation within the prostate.
- It can be infectious or non infectious.
- It may be acute or chronic.
- The condition is acutely painful and persistent and can be associated with chronic pelvic pain (Engeler et al).

**Causes**
- Incomplete emptying of the bladder and LUTS.
- Urinary tract organisms: E.coli, Proteus, Klebsiella.
- Post operation: vasectomy.
- Prostatic calculi.
- Post catheterisation.
- Differentials: testicular torsion, testicular tumour, hernia, lipoma of the cord, hydrocoele.
**History**
- LUTS (obstructive), incomplete emptying, UTIs.
- Perineal pain-acute and persistent, low back or pelvic pain.
- Dysuria, prostatic calculi being passes, urethral discharge.
- Fever, chills, myalgia, arthralgia, premature ejaculation, pain on ejaculation.
- History of being post sclerotherapy for rectal cancer.
  - (Dickinson)

**Examination**
- Abdomen and perineum: Palpable bladder (incomplete emptying), tenderness in flanks (retention)
- Scrotal skin changes
- Tender perineum
- DRE: size, tenderness (prostatitis/abcess), consistency of prostate (boggy prostate, abcess).

**Investigations**
- Urine culture (DRE then collection of urine culture).
- If septic, blood cultures
- IV line
- Bloods: FBC, CRP, Renal function
- TRUS/MRI to rule out abcess.
- PSA later

**Outcome**
- IVI access, IV abx- according to trust policy- gent, metro and taz usually.
- Fluid resuscitate and catheterise- strict fluid balance.
- Treat with antibiotics.
- Even if abcess, consider IV antibiotic therapy 1st. Drainage of a prostatic abcess can make a patent septic enough to require ITU.
- NSAIDS and tamsulosin.
- Lifestyle measures- avoid stress, try and identify triggers.
- Physical therapy, massage therapy, exercise therapy.
- Sepsis source control.
- Prevention: drink 1.5 L water a day.
  - (Rees et al)
Suggested Reading

Diagnostic Pathway for Prostatitis

Patient presents with pain in the perineum and dysuria

Focused history of LUTS, AUR, UTIS, perineal pain or UTIS, fevers, premature or painful ejaculation.

Examine Abdomen and perineum: Palpable bladder (incomplete emptying), tenderness in flanks (retention)

History of being post sclerotherapy for rectal cancer, history of stones, prostatic calculi or bladder stones

Assess scrotal skin

DRE: size, tenderness (prostatitis/abcess), consistency of prostate (boggy prostate, abcess).
Fig. 60.1 MRI demonstrating acute prostatitis

Suggested Reading

Management Pathway for Prostatitis

**Prosatis clinically confirmed**

- Urine culture (DRE then collection of urine culture)
- TRUS to rule out abscess
- PSA Not to be done at time of infection

**If pt septic and in retention with prostatitis IV access, IV abx according to trust policy-gent and co-amox.**

- Fluid resuscitate and catheterise- strict fluid balance Catheterise pt and drain bladder

**OPD Management**

- Treat with antibiotics
- NSAIDS and tamsulosin
- Sepsis source control
- Prevention: drink 1.5 L water a day

**Try lifestyle measures, cut out caffeine, stress, identify specific triggers.**

- Second line therapy - Take patient to theatre for rigid cystoscopy and prostatic massage.

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**Suggested Reading**


Renal/Ureteric Colic

Definition

- Caused by renal calculi passing through the urinary tract, causing obstruction to the flow of urine.
- Pain is acute, usually in the flanks radiating to groin.
- Pain does not improve, no matter what position the patient is in.
- Intermittent pain (colicky) which becomes persistent.
- (Teichman et al)

Causes

- Risk factors for stones:
  - Decreased water intake < 1.5L.
  - Caffeine intake.
  - High protein or salt diet.
  - Vitamin supplements.
  - Diet high in broccoli or spinach (Calcium oxalate).
  - High consumption of dairy products.
  - Urinary tract infections, poor urinary drainage.
  - (Turk et al).
**History**
- Flank pain-radiating to groin (if stone is passing).
- Fever, chills, rigors.
- Nausea and vomiting.
- Luts and prior obstruction.
- Haematuria.
- Prior history of stones, operations, stent insertion.
- Risk factors for stones (box above)

**Examination**
- Observations- is the patient pyrexial or septi?
- Abdomen: Tenderness in flanks, radiating to groin, palpable mass in flanks (?renal tumour/clot colic), palpable bladder (retention, stones obstructing).
- Rule out other pathology- AAA, acute appendicitis, bowel perforation, chest infection, ovarian cyst, ileus.
- Scrotal examination, review of external urethral meatus (? tight-phimosis/BXO), passage of any stones in urine- has the patient passed it out?

**Investigations**
- Urine analysis and culture- catheterise if septic.
- If septic, blood cultures, ABG.
- IV lines.
- Bloods: FBC, CRP, Renal function.
- In a septic patient, simultaneous assessment and management.
- CT KUB- plain CT- low dose.
- Do not do a CT with contrast as stones will not be seen. (stones are white on CT, contrast is also white).

**Outcome**
- IVI access, IV abx- according to trust policy- gentamicin usuall. Even if renal; function deranged- giveone renal dose of gent and discuss with microbiology re policy- co-amoxiclav if not penicillin allergic.
- Fluid resuscitate and catheterise- strict fluid balance.
- Treat with antibiotics, check sensitivities on blood and urine culture.
- NSAIDS and tamsulosin- if stone < 5mm, in ureter with no evidence of obstruction, hydrenephrosis or perinephric stranding, normal renal function, no sepsis.
- If evidence of obstruction, stone 6mm or greater, deranged renal function-patient requires rigid cystioscopy and ureteric stents.
- If patient septic with obstructive stone, for neprostomy insertion with antegrade stents and nephrostomyremoval at a later date.
- ITU/ HDU admission if eptic and HD unstable.
- Follow-up: Stone clinic to preassess patient. If stone < 1 cm none obstructive For ESWL.. If stented and < 1 cm for URS. If > 1 cm and in renal pelvis for PCNL.
- (Buttitude et al)
Suggested Reading

Diagnostic Pathway for Stones

Patient presents to A&E with flank pain, fevers and rigors

History of flank pain, extent/duration, fevers, rigors, nausea or vomiting.
History of LUTS/ UTIs
Risk factors for stones-water intake (>1.5 L/day), prior stones, diet high in salt, dairy, spinach broccoli.

Abdomen: Tenderness in flanks, palpable mass in flanks, palpable bladder (retention, stones obstructing).
Rule out other pathology-AAA

If pt septic IVI access, IV abx- according to trust policy- gent usually
Fluid resuscitate and catheterise- strict fluid balance.

Urine culture, Bloods: FBC, CRP, Renal function
CT KUB-plain CT-low dose.

Fig. 63.1 An IVU (intravenous urogram)
Suggested Reading


Management Pathway for Renal Stones

Renal stones

If >7 mm, or obstructing
Keep patient NBM and list for ureteric stent
If septic, nephrostomise patient

Definitive management
If <1 cm list for rigid/flexible ureteroscopy
If 1–3 cm consider PCNL with MAG 3 to assess renal function

If <5 mm and none obstructing within the kidney, consider Active Surveillance with annual USS KUB
See patient annually in OPD

Warn patient that stone may move causing acute obstruction—also advise to come straight to A+E, if that happens as CT KUB will be required.

If patient wants surgery, list for flexible/rigid ureteroscopy +/- stent or ESWL
**Fig. 64.1** New generation lithotripters for ESWL

**Fig. 64.2** Appearance of ureter at ureteroscopy with guidewire
Fig. 64.3  Passage of a flexible ureteroscope over a guide wire to the right kidney

Fig. 64.4  A nephroscope for PCNL and dilators for insertion
**Suggested Reading**


Management Pathway for Ureteric Stones

Ureteric stones
May become obstructed at the PUJ, VUJ or pelvic brim

- If > 6 mm, or obstructing
  Keep patient NBM and list for ureteric stent
  If septic, nephrostomise
- If < 1 cm list for rigid/flexible ureteroscopy
- If 1–3 cm consider PCNL with MAG 3 to assess renal function
- Warn patient that stone may move causing acute obstruction - if it happens to come into A+E
- If patient is fit for surgery, flexible/rigid ureteroscopy +/- stent or ESWL

Definitive management
Fig. 65.1 Laser fragmentation of stone in ureter. The laser is seen at 6 o’clock and the guidewire appears green (PTFE) at 1 o’clock

**Suggested Reading**


Ureteral Clot Colic

**Definition**
- Colic caused by blood clot passing from the kidney or renal pelvis down the ureter to the bladder
- The pain is caused by the clot obstructing the ureter.
- The origin of the blood clot is most often from RCC of the kidney, or TCC of the urothelium.
- If obstructed for a period of time, patients can present with sepsis.

**Causes**
- Bleeding and clots in the urinary tract (ureter).
- Renal cell carcinoma of the kidney.
- Transitional cell carcinoma of the urothelium.
- Urinary tract infection.
- Renal or ureteric stones.
- Post operative-partial/nephrectomy, pyeloplasty, post ureteric stent insertion.
- Bleeding diathesis, haemophilia. (Evins et al)
- Henoch Schon Purpura leading to urethritis (Robson et al)

**History**
- Flank pain-radiating to groin (as clot passes).
- Fever, chills, rigors.
- Nausea and vomiting.
- Haematuria-look for histroy of prior haematuria investigations.
- Prior history of stones, operations, stent insertion.
- Risk factors for stones (box above)/Pain.
Suggested Reading

Diagnosis of Ureteral Clot Colic

Patient presents with flank pain, fevers or rigors.

Flank pain-radiating to groin (as clot passes)
Fever, chills, rigors, UTIS, haematuria.

Prior history of stones, operations, stent, prior diagnoses of upper tract cancer or ureteroscopy.

Abdomen: Tenderness in flanks, radiating to groin, palpable mass in flanks (?renal tumour/clot colic), palpable bladder (retention).

Urine culture, bloods, cultures if septic.
CT IVU-urogram to look for filling defects.

Suggested Reading


Clot colic confirmed on CT

Look for a cause
Keep PT NBM

If obstructed on CT and patient not septic, list for rigid cystoscopy and ureteric stent insertion.

If not septic, treat with antibiotics, fluids and catheterisation to see if clot will pass.

If patient septic, give antibiotics and fluids and list for nephrostomy.

TCC diagnosed and patient fit for major surgery, list for nephroureterectomy.

If not fit for major surgery, consider endoscopic management of TCC with ureteroscopy and laser.

Treat the cause
if TCC of ureter, for diagnostic ureteroscopy, biopsy.

If TCC ureter and fit, list for nephroureterectomy, if not, for endoscopic management, ureteroscopy and laser.

If not septic, treat with antibiotics, fluids and catheterisation to see if clot will pass.
Fig. 68.1 Stent in situ with extravasation
**Fig. 68.2** TCC tumour in ureter

**Fig. 68.3** Laser fulguration of TCC ureter

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**Suggested Reading**


Pelvi-Ureteric Junction Obstruction

**Definition**
- Narrowing of the ureter where it joins the renal pelvis.
- The pain is caused by impaired flow of urine.
- This type of obstruction can also impair renal function.
- Whilst a CT urogram (with contrast) will delineate anatomy, a MAG 3 renogram with post micturition phase will be diagnostic of obstruction.
- Most often, the patient presents to OPD with intermittent niggling pain, but this patient can also present septic in obstruction.

**Causes**
- Congenital.
- One of the most common causes of hydronephrosis in children.
- It can also arise in the lower pole moiety of duplex systems or incomplete duplex systems (Avian et al, Gonzalez et al).
- There is a familial association to those suffering from Vescio ureteric reflux (Manouvrier et al).
- It can be associated with bilateral multicystic dysplasia (Groener).
History

- Intermittent flank pain (Ward).
- Recurrent UTIS or stones (Atug et al, Wah et al).
- Worse at night, after drinking large amounts of fluid or alcohol.
- Fevers and rigors, sepsis.
- Presentation with pyonephrosis.
- LUTS.

Examination

- Abdomen: Tenderness in flanks, radiating to groin, palpable mass in flanks (?renal tumour/clot colic), palpable bladder (retention).
- Rule out other pathology: AAA, acute appendicitis, bowel perforation, chest infection, ovarian cyst, ileus.

Investigations

- Urine analysis and culture - catheterise if septic
- Uroflowmetry and post void residual (ensure the patient is not in retention and emptying properly).
- Bloods - renal function, FBC and CRP.
- CT urogram to see anatomy and MAG 3 renogram with post micturition (Tasca et al).

Outcome

- If patient has PJUO with impairment of renal function, and is fit for procedure - counsel regarding pyeloplasty - lap or robotic.
- Follow-up MAG 3 renogram to reassess split renal function and blood to assess renal function.
- Patients can be conservatively managed if renal function is stable, but they need to be very closely followed up (Goyal et al).
- However, if a patient is symptomatic, septic or has deranged renal function emergency intervention is needed.
- In the first instance, this would be a stent or nephrostomy, but definitive therapy would be a pyeloplasty.
- This can be done via endoscopic, open, laparoscopic or robotic methods.
- If unfit for major surgery, it can be managed with regular stent changes.
Suggested Reading


Diagnosis of PUJO

Patient presents in OPD with pain in the flanks, worse at night and worse after drinking alcohol.

History of Intermittent flank pain, Worse at night, after drinking large amounts of alcohol, recurrent UTIS. Symptoms have been present over a long period of time.

Abdomen: Tenderness in flanks, palpable mass in flanks (?renal tumour/clot colic), Rule out other pathology-AAA.

Pt can present septic to A+E. IV access, IV abx-according to trust policy-gent and co-amox usually. Fluid resuscitate and catheterise-strict fluid balance, blood and urine culture. CT Urogram

Urine culture, Bloods: FBC, CRP, Renal function CT Urogram and MAG 3 renogram to identify PUJO. Assess fitness for major surgery.

Look for a family history or history of other renal conditions or anomalies.

Suggested Reading


Management of PUJO

CT Urogram confirms PUJO

MAG 3 renogram to confirm split renal function

If patient not fit, consider endopyelotomy, ureteric stenting or conservative management

(If dead kidney, consider nephrectomy for pain, or sepsis)

If patient stented due to obstruction, MAG 3 renogram will not be gained, list for pyeloplasty (if the stent is removed, the patient will re-obstruct)

Follow-up MAG 3 renogram to reassess split renal function and blood to assess renal function.

If patient has PUJO with impairment of renal function, and is fit for procedure—counsel regarding pyeloplasty-lap or robotic.

Suggested Reading


Hydronephrosis

Definition

- Dilation of the renal pelvis
- May also include the ureter (hydro-ureteronephrosis)
- Usually due to an obstructive or functional cause
- Can be uni or bilateral
- If severe, can impair renal function.
- Has a number of causes

Causes

- Unilateral: ureteric/bladder tumour, prostate cancer, stones, infection, stricture, external compression, retroperitoneal fibrosis (Woodward et al).
- Bilateral: retention, prostate cancer, extensive bladder tumour, stones, reflux via re-implanted ureters.
- Pregnancy-usually right sided over left.
- Congenital anomalies (Toka)

History

- Flank pain (Mergener et al).
- UTIS.
- Fevers and rigors, sepsis.
- Nausea and vomiting.
- LUTS, retention.
- Haematuria-history of cancers, stones.
**Examination**
- Abdomen: Tenderness in flanks, palpable mass in flanks (?renal tumour/clot colic), palpable bladder (retention).
- Scrotal examination-assess for penile cancer, external urethral meatus (no phimosis).
- DRE-Size of prostate, volume, consistency (?BPH/Prostate cancer)

**Investigations**
- If flank pain-plain CT KUB-if contrast is used, you will not see stones.
- Bloods-FBC, CRP, U+Es.
- Urine analysis and urine culture.
- If septic-septic screen and ABG-lactate.
- Haematuria-haematuria investigations-CT IVU EGFR >30 and flexible cystoscopy.
- If pregnant, USS KUB or MRI.
- If prostate cancer-PSA. If <15, MRI and trasnperineal biopsy, if PSA>15 for bone scan.
- If penile cancer suspected, MRI penis.

**Outcome**
- Catheterise patient and measure residual.
- Monitor renal function-if damaged and not improving despite catheterisation, consider ureteric stent or nephrostomies.
- Treat the cause.
- If bladder cancer and localised, do a CT chest to complete staging and list to resect tumour. Once resected, the obstruction is removed and hydronephrosis should resolve, if not, consider ureteric stenting and removal of stent at a later date-follow diagnostic pathway.
- If prostate cancer-and patient fit for surgery/radiotherapy which should relieve obstruction-keep patient catheterised.
- IF penile cancer-if patient fit consider listing for glansecotmy if superficial, or partial/total penectomy.
- If stones, an patient obstructed-follow pathway for renal colic.

**Suggested Reading**
Diagnosis of Hydronephrosis

Patient presents to A+E with flank pain

Abdomen: Tenderness in flanks, palpable mass in flanks, palpable bladder (retention, stones obstructing). Rule out other pathology-AAA

Look for a cause - tumour, prostate cancer, stones, infection, stricture, external compression.

If pt septic IV access, IV abx according to trust policy - gent and co-amox usually Fluid resuscitate and catheterise - strict fluid balance

Urine culture, Bloods: FBC, CRP, Renal function CT KUB-plain CT-low dose. Do not do a CT with contrast as stones will not be seen. (stones are white on CT, contrast is also white).

Fig. 73.1  Hydronephrosis on USS
Fig. 73.2  Hydronephrosis on CT

Fig. 73.3  MAG 3 demonstrating a right obstructed kidney, with uptake but poor excretion. Study conducted in a patient with ileostomy (urostomy)
Fig. 73.4 An IVU conducted in same patient, demonstrating obstructive features—hydronephrosis and dilated calyces

Suggested Reading

CT KUB confirms Hydronephrosis-if not septic or no renal function derangement (partial obstruction) look for a cause and treat the cause.

Unilateral obstruction

If pt septic IV access, IV abx according to trust policy—gent and co-amox usually Fluid resuscitate and catheterise—strict fluid balance Decompress system with stent or nephrostomy.

Look for a cause—ureteric or renal stone obstructing—stent/nephrostomy if septic or renal function deranged.

If ureteric, renal tumour, and patient not septic, with normal renal function, list for diagnostic ureteroscopy.

Treat the specific cause keep bladder and urinary system decompressed with catheter. If IV fluids, Abx and catheterisation have not worked, consider stent/nephrostomy.

Bilateral hydronephrosis—catheterise

If ureteric, renal tumour, and patient not septic, with normal renal function, list for diagnostic ureteroscopy.
Fig. 74.1 An IVU demonstrating reflux

Fig. 74.2 An NM scan demonstrating severe reflux
Fig. 74.3  Demonstrating a pyelonephritic kidney and normal kidney

Fig. 74.4  USS demonstrating a lower pole hydronephrosis

Suggested Reading

Renal Trauma

**Definition**
- Damage to the renal parenchyma, collecting system or vasculature.
- Most commonly the result of a direct blow to the paravertebral gutter/flank.
- Can also happen as a part of RTCs, eg fall onto a side, off a motor bike.
- Is usually managed conservatively, unless haemodynamically unstable.
- Is graded 1–5, as per AAST trauma grading.
- Up to grade 4 can usually be managed conservatively long as patient is haemodynamically stable and not passing haematuria.

**Causes**
- Blunt trauma, falling on the side, or a blow to the flank (tends to be managed conservatively, if haemodynamically stable) Kautza et al.
- Deceleration type injuries
- Penetrating trauma-stab wound or gunshot
### History
- History of trauma, when, where, how did it occur?
- Pain in the flank?
- Haematura or retention present?
- Loss of consciousness/dizziness
- Collateral history-allergies, past medical history, events leading up to trauma, last meal time.

### Examination
- ATLS approach-ABCDE
- Abdomen: Tenderness in flanks, palpable mass in flanks (haematoma, expansile pulsatile mass-bleeding kidney), bruising overflanks, palpable bladder (retention), penetrating wounds.
- Scrotal examination-blood at the external urethral meatus, intact scrotum?
- DRE.

### Investigations
- Simultaneous assessment and management.
- ABCDE approach, observations.
- IV access, Bloods FBS, U+Es, LFTs, clotting and G+S.
- Catheterise.
- Trauma CT-keep patient in spinal immobilitation-request CT Urogram if renal function normal-triple phase CT, looking at vasculature and excretory phase.

### Outcome
- Grades 1–4 managed conservatively with bedrest, IV access and antibiotics.
- Keep patient catheterised to monitor urine output.
- Follow the patient up in outpatients in 6 weeks, advise the GP to monitor BP. (McCombie et al)
- Grade 5-shattered kidney, keep patient NBM, if haemodynamically unstable list for trauma nephrectomy. Contact vascular surgery, as part of this procedure involves clamping the aorta.
- If going to theatre, Crossmatch 4 units blood, FFP and platelets.
- An on table IVP would be conducted and vascular control would be obtained prior to trauma nephrectomy. (McClung et al, Yeung et al)
Suggested Reading

Grading of Renal Trauma

Grade 1
- Contusion
- Subcapsular perirenal haematoma

Grade 2
- Superficial laceration <1 cm depth

Grade 3
- Laceration >1 cm

Grade 4
- Laceration extends to renal pelvis or urinary extravasation
- Renal artery or vein with contained haemorrhage
- Segmental infarctions without associated lacerations
- Expanding subcapsular haematomas

Grade 5
- Shattered kidney
- Avulsion of renal hilum: devascularisation of a kidney due to hilar injury
- Ureteropelvic avulsions
- Complete laceration or thrombus of the main renal artery or vein
**Fig. 76.1** Grade 1 renal trauma on CT

**Fig. 76.2** Grade 2 renal trauma on CT

**Fig. 76.3** Grade 3 renal trauma on CT
**Fig. 76.4** Grade 4 renal trauma on CT

**Fig. 76.5** Grade 5 renal trauma on CT

**Suggested Reading**

**Diagnostic Pathway for Renal Trauma**

**Patient admitted to A+E after RTC**

- History of trauma
  IF RTC, what, where, seatbelt use ATLS approach-rule out other major injuries

- ATLS approach-ABCDE
  Abdomen: Tenderness in flanks, palpable mass in flanks (haematoma), bruising overflanks, palpable bladder (retention), penetrating wounds.
  Scrotal examination-blood at the external urethral meatus, intact scrotum

- Collateral history-allergies, medical history, events leading up to trauma, last meal time

- IV access, bloods FBS, U+Es, LFTs, clotting and G+S
  Catheterise

- Trauma CT-keep patient in spinal immobilisation-request CT Urogram if renal function normal-triple phast CT, looking at vasculature and excretory phase

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**Suggested Reading**


Management Pathway for Renal Trauma

Trauma CT confirms renal trauma

Grades 1–4-keep patient catheterised, on bed rest, monitor for haematuria, decompensation of observations.

Usually patient is discharged home in 4–5 days on antibiotics. See patient back in clinic in 2 months for MAG 3, renal function and let GP know to monitor BP.

Grade 5 or penetrating wound Keep pt NBM CXM 4 U blood, 4 FFP and platelets-major haemorrhage protocol List for trauma nephrectomy Get ITU help-pt is usually very unstable.

For the operation, have input from a vascular surgeon to get clamp straight on the aorta and IVC for vascular control. Have a full vascular set available including a vascular gun and sloops. Once vascular control has been obtained, mobilise the kidney.

Management patient post operatively on ITU they would have lost a lot of blood. See patient back in OPD in 2 months with renal function beforehand, inform GP to check BP.
Fig. 78.1 Surgical management of renal trauma

Fig. 78.2 Gunshot to the abdomen

Suggested Reading


Ureteric Trauma

Definition

• Damage to the ureter, which may be partial or total.
• Commonly caused by ureteroscopy, colorectal surgery or gynecological or vascular surgery (Burks et al).
• Management depends on whether injury is total or partial, and position on the ureter (proximal, mid or distal).
• Immediate repair is ideal, but injuries may be picked up some time after the surgery.
• Injury is graded 1–5 (Allen et al).

Causes

• Ureteroscopy—with a difficult ureter especially with poor vision or a rough insertion of an access sheath, it is very easy to go through a ureter and into the abdomen—don’t push a ureteroscope if vision is poor (Burks et al). (Watterson et al).
• Colorectal surgery, if the ureter is not properly identified, especially on the left, or not stented beforehand, it can be easy to damage, especially during a difficult dissection on the left side.
• Gynaecological surgery—during an abdominal hysterectomy.
• Penetrating trauma—gunshot, or knife (Bruno et al).
Examination

• ATLS approach-ABCDE.
• Is the patient septic?
• Observations-temperature, heart rate, RR.
• Abdomen: Tenderness in flanks, palpable mass in flanks (renal, urinoma, abcess), palpable bladder (retention), penetraing wounds/surgical wounds.

Investigations

• Simultaneous assessment and management.
• ABCDE approach, note observations.
• IV access, bloods FBS, U+Es, LFTs, clotting and G+S.
• Catheterise.
• If post surgery, CT urogram, to assess position (upper, mid, lower third) and extent of trauma to ureter (haematoma, <50% diameter, >50% diameter, total injury).

Outcome

• Ideal assessment is done at time of injury-rigid cystoscopy, retrogrades +/-stent and immediate repair (uretero-ureterostomy, transuretero-ureterostomy, psoas hitch or boari flap).
• If Haematoma (conservative management +/-stent), < 50% use ureteric stent.
• If > 50% may require repair-ureteroureterostomy / pelvicalycostomy (upper third injury), transureterourterostomy (mid third ureter), psoas hitch or boari flap (lower third).
• If detected after surgery, drain kidney via nephrostomy and reconstruct in 2 months.

History

• Review the notes-if surgery beforehand, was it a difficult procedure, was the ureter identified, isolated and protected?
• Was the ureter pre-stented and easily identifiable as a result?
• Time since surgery or trauma-less than 24 hours or extending into weeks?
• If so nephrostomise and book for reconstruction in 2 months
• Patient symptoms: pain in the flank, haematuria, fevers/ rigors
• Collateral history-allergies, medical history, events leading up to trauma, last meal time.
Suggested Reading


Ureteric Injury Severity Scale

Grade 1
- Contusion
- Haematoma
- With or without devascularisation

Grade 2
- <50% transection of ureter

Grade 3
- >50% transection of ureter

Grade 4
- Complete transection
- < 2cm devascularisation

Grade 5
- Avulsion with > 2 cm devascularisation
Suggested Reading

Diagnostic Pathway for Ureteric Trauma

Patient presents to A+E post surgery with pain in the flank

History-difficult prior surgery, ureter identified ad protected or stented? History of ureteroscopy and stenting

ATLS approach-ABCDE
Is the patient septic?
Abdomen: Tenderness in flanks, palpable mass in flanks (renal, urinoma, abscess), palpable bladder (retention), penetrating wounds/ surgical wounds.

Patient symptoms: pain in the flank, haematuria, fevers/ rigors Collateral history-allergies, medical history, events

IV access, bloods FBS, U+E, LFTs, clotting and G+S Catheterise
IF post surgery, CT urogram, to assess position (of injury)
Fig. 81.1  IVU through a nephrostogram demonstrating ureteric injury (the contrast is not draining down through the ureter to the bladder)

Suggested Reading


Management of Ureteric Injury

CT Urogram confirms ureteric injury

Ideal assessment is done at time of injury-rigid cystoscopy, retrogrades +/- stent and immediate repair (primary repair, uretero-ureterostomy, psoas hitch, boari flap) if Haematoma (conservative management +/- stent), < 50% use ureteric stent.

Rigid cystoscopy and retrograde so be repeated at 4 weeks to ensure ureter has healed.

Time since surgery or trauma-less than 24 hours or extending into weeks? If so nephrostomise and book for reconstruction in 2 months leading up to trauma, last meal time

If > 50% may require repair-ureteroureterostomy / pelvicalyceostomy (upper third injury), transureteroureterostomy (mid third ureter), psoas hitch or boari flap (lower third).

Fig. 82.1 Primary repair of a ureter
Suggested Reading


Bladder Trauma

Definition

- Damage to the bladder.
- Commonly caused by resection of tumour or cystoscopy, blows to a full bladder, gynaecological surgery, wearing a seatbelt across a full bladder.
- Management depends on whether injury is extra or intraperitoneal
  - It is graded 1-5 (Allen et al).
- Check for associated rectal injury (Pereira et al).

Causes

- Transurethral resection of bladder tumour—some tumours are extensive and it is difficult to determine where the bladder wall is, as a result, resection of bladder wall can occur. Tumours at the dome or anterior wall are more liable to have an intraperitoneal perforation.
- Cystoscopy or cystoscopy and biopsy—very elderly women, it is easy to pass a cystoscope through a thin bladder wall.
- Gynaecological surgery—during an abdominal hysterectomy or c-section, it can be difficult to see the plane between the bladder and uterus—so a result, bladder trauma can occur.
- Penetrating trauma to the lower abdomen—gunshot, or knife (Uwais et al).
- Pelvic fractures.
- Blunt trauma to the lower abdomen (Kong et al).
**History**

- Review the notes—what were the events leading up to bladder trauma?
- Was it an RTC, was the patient restrained? Is there suprapubic pain, retention, or visible haematuria.
- If bladder injury during surgery, was the bladder identified, or was it a difficult procedure.
- Time since surgery or trauma—very often, especially if an extraperitoneal injury, patients present late.
- Collateral history—allergies, medical history, events leading up to trauma, last meal time, full bladder at time of incident.

**Examination**

- ATLS approach—ABCDE
- Is the patient septic?
- Abdomen: Tenderness in flanks, palpable mass in flanks (renal, urinoma, abscess), palpable bladder (retention), penetrating wounds/ surgical wounds.

**Investigations**

- Simultaneous assessment and management.
- ABCDE approach—observations.
- IV access, bloods FBS, U+E, LFTs, clotting and G+S.
- Catheterise.
- A retrograde cystogram to assess extent of injury—whether extra or intraperitoneal (needs at least 400 mls of contrast in the bladder to demonstrate injury).
- If no leak is demonstrated, it may just be bladder contusion.
- Extra and Intra peritoneal leakages may be demonstrated.
- If injury occurs on table, assess the extent and degree of severity of injury.

**Outcome**

- Ideal assessment is done at time of injury—immediate repair if patient has an open procedure—mass closure of the bladder with absorbable interrupted sutures.
- If done during resection of tumour, do an on table cystogram, to assess whether extraperitoneal or intraperitoneal.
- If extraperitoneal, catheterise for two weeks and then do a pericatheter cystogram.
- If there is no leak, remove catheter.
- The indications for surgery with extraperitoneal rupture are clot retention, pelvic bone puncturing bladder wall, bladder not healing with extravasation ongoing, bladder neck injury, undergoing open surgery for other procedures.
- If intraperitoneal, patient requires lower midline laparotomy and formal closure of the bladder.
- If patient presents as an outpatient, conduct a retrograde cystogram immediately and keep the patient catheterised.
Suggested Reading


Injury Severity Scale, Bladder Trauma

**Grade 1**
- Contusion, intramural haematoma
- Partial thickness laceration

**Grade 2**
- Extraperitoneal bladder wall laceration <2cm

**Grade 3**
- Extraperitoneal laceration >2cm
- Intraperitoneal (<2cm) bladder wall laceration

**Grade 4**
- Intraperitoneal bladder wall laceration >2cm

**Grade 5**
- Intraperitoneal or extraperitoneal bladder wall laceration extending into the bladder neck or ureteral orifice (trigone)

**Suggested Reading**

Diagnosis of Bladder Trauma

Patient presents to A+E post surgery with haematuria and supra pubic pain.

History- TURBT, cystoscopy, ureteroscopy, obstetric history, Penetrating trauma or pelvic fractures.
Is the patient in pain or septic? When did they last empty their bladder?

Simultaneous assessment and management ABCDE approach, observations IV acess, bloods FBS, U+Es, LFTs, clotting and G+S Catheterise, give abx

ATLS approach- ABCDE Abdomen: palpable bladder (retention), penetrating wounds/ surgical wounds- on catheterisation is there haematuria? Is the catheter draining?

Conduct retrograde cystogram- 16 fr catheter into the bladder, 2 mls into the balloon, 400 mls of 50-50 contrast and saline into the bladder, with x-rays taken.

Fig. 85.1 Cystogram demonstrating intraperitoneal leakage
Suggested Reading


Management of Bladder Trauma

Retrograde cystogram conducted demonstrating bladder injury

- Extra-peritoneal
  - If extraperitoneal injury, keep catheter in situ for 3 weeks and keep on antibiotics
  - Conduct pericatheter cystogram if trauma healed, remove catheter.

- If intraperitoneal injury, patient needs laparotomy and primary bladder closure
  - List for theatre for two-layer bladder closure (interrupted absorbable sutures).
Fig. 86.1 Demonstrating repair of intraperitoneal bladder rupture-interrupted closure with absorbable sutures

Suggested Reading


Urethral Trauma

Definition

• Damage to the urethra which maybe partial or total.
• Can be anterior (saddle injury/ penile fracture) or posterior (pelvic fracture).
• Management depends on whether injury is total or partial.
• Urinary diversion with and SPC is required
• It is graded from 1–5 (Allen et al).

Causes

• Anterior-cycling injuries-straddle injuries or Penile fracture.
• Posterior-pelvic fracture.
• Blunt trauma.
• Penetraining trauma (Uwais et al).
• (McGready et al)
Examination

- ATLS approach-ABCDE
- Is the patient septic?
- Abdomen:
  - Palpable bladder (retention)
  - Penetrating wounds/ surgical wounds
  - Bruising in the perineum
  - Blood at the meatus

Investigations

- Simultaneous assessment and management.
- ABCDE approach, observations.
- IV access, bloods FBS, U+Es, LFTs, clotting and G+S.
- Catheterise do not force the catheter, if unable to pass urethrally, place and SPC.
- Trauma CT.
- Urethrogram-30 degree oblique position bottom leg flexed at the hip and the knee.

Outcome

- If able to pass catheter-drain bladder and pericatheter urethrogram in 2 weeks.
- If urethra is intact, twock.
- If strictures present, assess length for management-optical urethrtomy or primary reconstruction in 3 months.
- If unable to pass catheter-SPC to drain bladder or open cystostomy if pelvic haematoma.
- At a later date conduct voiding cysturethrography and twock if no strictures and no disruption of urethra.
- If urethra disrupted, keep catheterised and book for reconstruction in 3 months at a specialist centre.
**Fig. 87.1** Position of patient for urethrogram

**Fig. 87.2** Normal urethrogram
Suggested Reading


Urethral Injury Severity Scoring

Grade 1
- Contusion
- Blood at urethral meatus; retrography normal

Grade 2
- Stretch injury
- Elongation of urethra without extravasation on urethrography

Grade 3
- Partial disruption
- Extravasation of urethrography contrast at injury site with visualization in the bladder

Grade 4
- Complete disruption
- Extravasation of urethrography contrast at injury site without visualization in the bladder
- <2cm of urethra separation

Grade 5
- Complete disruption
- Complete transaction with >2 cm urethral separation
- Extension into the prostate or vagina
Suggested Reading

Diagnosis of Urethral Trauma

Blood at the meatus after saddle injury or pelvic fracture.

Trauma- SPC pain- retention, haematuria, fevers/rigors, bruising on the perineum. Collateral history- allergies, medical history, events leading up to trauma, last meal time.

Simultaneous assessment and management ABCDE approach, observations IV access, bloods FBS, U+Es, LFTs, clotting and G+S
Catheterise- do not force the catheter, if unable to pass urethrally, place and SPC

ATLS approach- ABCDE
Is the patient septic?
Abdomen: palpable bladder (retention), penetrating wounds/ surgical wounds, bruising in the perineum, blood at the meatus

Trauma CT
Urethrogram- 30 degree oblique position bottom leg flexed at the hip and the knee.

Suggested Reading


Management Urethral Trauma

Catheter insertion

- Catheter passed
- Urethra intact
- Pericatheter urethrogram in 2 weeks

If urethra is intact, twock.

If strictures present, assess length for management: optical urethrtomy or primary reconstruction in 3 months. Teach ISD.

If unable to pass catheter

- SPC to drain bladder or open cystostomy if pelvic haematoma
- then voiding cystourethrography at a later date

Twock if no strictures and no disruption of urethra.

If urethra disrupted, refer to tertiary centre for reconstruction at 3 months.

Suggested Reading


Testicular Trauma

Definition
- A blow to the testicle, which may cause rupture to the tunica albuginea
- The defining factor for surgical intervention, is whether the tunica albuginea is intact or not, and whether the skin is breached.
- Rule out other injuries.
- It is graded 1–5 (Allen et al).

Causes
- A blow to the testicle in sports.
- Blunt or penetrating trauma.
- A straddle injury to the scrotum.
- In a trauma patient, assess for testicular injury.
**History**
- A history of a blow to the testicles-time since the injury
- A history of trauma to the scrotal region.
- Associated skin lacerations, swelling or bruising to the scrotum.
- Events leading up to trauma, history of event, associated injuries, pelvic fractures, allergies, medications.

**Examination**
- ATLS approach.
- Primary survey.
- Review the abdomen: palpable bladder, masses/bruising in the flanks (renal trauma).
- Is there blood at the external meatus? Rule out bladder and urethral trauma.
- Examine each hemiscrotum in turn, for swelling, pain, skin laceration, are the testes palpable and intact? (Naseer et al).

**Investigation**
- Bloods including FBC, U+Es, CRP, LFTs and clotting.
- If the skin is intact, USS the scrotum to determine if the tunica albuginea is intact or breached and to determine the blood supply to the testicle.
- USS with contrast enhancement also has a role in assessment of the testicle prior to exploration (Hedayati).
- If the skin is breached, the patient will need to go to theatre for exploration and closure.
- If the testicle is non-viable, consent for prosthesis at a later date (Jacob et al).

**Management**
- Ultimately, if the tunica is not intact, surgical exploration will be needed.
- If the skin is closed, USS of scrotum, to determine this.
- If the skin of the scrotum is opened, or there is testicular rupture, formal exploration in theatre and closure will be required.
- Check tetanus status, and give a shot if indicated.
Suggested Reading


Fig. 91.1 Urogram demonstrating urethral trauma
Testicular Trauma Injury Scale

- **Grade 1**
  - Contusion
  - Haematoma

- **Grade 2**
  - Subclinical laceration of tunica albuginea

- **Grade 3**
  - Laceration of tunica albuginea with <50% parenchymal loss

- **Grade 4**
  - Major laceration of tunica albuginea with ≥50% parenchymal loss

- **Grade 5**
  - Total testicular destruction or avulsion

**Suggested Reading**

Diagnosis of Testicular Trauma

Patient presents to A+E post trauma with a painful swollen testicle.

History- A history of a blow to the testicles-time since the injury. A history of trauma to the scrotal region, events leading up to trauma, history of event, associated injuries, pelvic fractures, allergies, medications.

Examine each hemiscrotum in turn, for swelling, pain, skin laceration, are the testes palpable and intact? Associate skin lacerations, swelling or bruising to the scrotum.

ATLS approach

- Review the abdomen: palpable bladder, masses/bruising in the flanks (renal trauma), is there blood at the external meatus? Rule out bladder and urethral trauma.

Bloods including FBC, U+Es, CRP, LFTs and clotting.

USS Testes

Suggested Reading


Management of Testicular Trauma

USS testes confirms testicle

- Tunica intact, but haematoma present
  - Give pain relief and antibiotics
  - Review in OPD in 2 months

- On USS - tunica breached or testicle none viable for theater
  - Keep patient NBM
  - Bloods inc clotting
  - List for theatre for closure of tunica.
  - If testicle none viable, for list for orchidectomy
Suggested Reading


Overactive Bladder

Definition

- Bladder overactivity-urgency, with or without incontinence, frequency and nocturia.
- Symptoms can be irritative in nature.
- If diagnosed on urodynamics, with no evidence of cause, it is known as idiopathic detrusor overactivity.

Potential causes of symptoms-

- Bladder outflow obstruction-BPH, prostate cancer, prostatic stricture, prosatattis.
- Infectious causes-UTIS, stones, cystitis.
- Neuropathic causes-Diabetes, lower motor neuron disease.
- Gynaecological: ovarian or uterine mass, pregnancy.
- Caffeine or fluid intake, urethral diverticula or urethral caruncle.
- (Corcos et al)
Examination
- Assess the abdomen: palpable bladder?
- If female, PV examination—evidence of atrophic vaginitis, cystocele, ureterocoele, pelvic masses, rectal prolapse.
- If male, DRE—size, consistency, and regularity of prostate.

Investigations
- Urine dip and culture—rule out haematuria, and UTIS.
- Flow rate—to assess the rate of bladder emptying, voided volume, and PVR.
- Bladder diary—to assess fluid intake, symptoms experienced, and voided volume.
- USS KUB—stones?, any bladder masses?
- Flexible cystoscopy—any bladder tumours, CIS.

History
- Frequency, urgency, nocturia, (storage symptoms).
- Weak stream, straining, hesitancy, terminal dribbling (voiding symptoms).
- Associated haematuria, UTIS, or incontinence.
- When did the symptoms start, extent, and duration.
- Past medical history and medicines.
- Bowel and gynaecological history—any episiotomies or tears.
- Neurological or medical conditions.
- Smoking.
- (Gormley et al)

Management
- Conservative management: bladder diary, weight loss, cut out caffeine, bladder retraining, PFE, stop smoking.
- 1st line medical therapy—oxybutinin, solifancin, tolteradine. (Jayarajan et al)
- Mirabegron (B3 agonist), then combination therapy with one of the above.
- If medical therapy fails, urodynamic analysis prior to operative intervention.
- Patients may not comply with medical therapy due to side effect profile (Tae Heon Kim).
- Then intravesical botox injections into the bladder (trigone sparing).
- If this fails, for referral to a specialist centre for neuromodulation, then clam augmentation cystoplasty if appropriate.
Suggested Reading

Diagnosis of Overactive Bladder

Suggested Reading


Management of Overactive Bladder

Patient clinically has symptoms of OAB

Conservative management: bladder diary, weight loss, cut out caffeine, bladder retraining, PFE, stop smoking.

If medical therapy fails, urodynamic analysis prior to operative intervention.

1st line medical therapy—oxybutinin, solifenacin, tolterodine. Mirabegron, then combination therapy with one of the above.

Then intravesical botox injections into the bladder (trigone sparing if this fails, for referral to a specialist centre for neuromodulation, then clam augmentation cystoplasty if appropriate.

Suggested Reading


Urinary Incontinence

Definition

- Involuntary leakage of urine in a socially unacceptable place.
- Stress incontinence - leakage on coughing, sneezing, increased abdominal pressure.
- Urge incontinence - leakage with associated urgency.
- Urinary incontinence maybe stress incontinence, urge incontinence or mixed incontinence.
- There are different paths of management depending on type.

Causes

- Stress incontinence: childbirth (episiotomies), forceps delivery (damage to external sphincter).
- Urge incontinence - leakage with associated urgency.
- Mixed incontinence.
Examination

- Review the abdomen:
  - Palpable bladder (?retention or high post void residuals),
  - Masses in flanks.
  - General abdominal examination, also looking for abdominal pathology, constipation, obstruction.
- PV examination (chapter one): leakage on cough test from urethra, atrophic vaginitis, cystocele, ureterocoele, rectoceles.

Investigation

- Urine dip and culture, flows.
- USS KUB and PVR-do they have other pathology (stones, obstructive uropathy) or a urethral stricture?
- Bladder diary, ICIQ and Quality of life questionnaires.
- Flexible cystoscopy-rule out a bladder tumour.
- Urodynamics-prior to surgery.
- (Burkhard et al)

Management

- Stress incontinence-conservative measures, weight loss, PFE exercises with a physiotherapist.
- TVT, TOT or bulking agents (Ellington et al).
- Urge incontinence-conservative measures, cut out caffeine.
- Medical therapy-oxybutinin, solifenacin, tolteradine
- Operative measure-botox injections, neuromodulation.
- Mixed incontinence-urodynamics to determine which symptoms are more bothersome then treat more bothersome.

History

- Extent and duration of symptoms-ICIQ-SF questionnaire.
- Exacerbation and progression.
- LUTS, UTIS, haematuria.
- Leakage episodes, pad weight, changes of clothing.
- Associated bowel and gynaecological history.
- (NICE Guidelines, CG171).
Suggested Reading


Diagnosis of Incontinence

Patient presents to OPD with incontinence

History-Irritative or obstructive symptoms, determine what kind of incontinence LUTS, UTIS, haematuria
Leakage episodes, pad weight, changes of clothing
Associated bowel and gynaecological history

Urine dip and culture, flows.
USS KUB and PVR
Bladder diary, ICIQ-SF questionnaire,
Quality of life questionnaire
Flexible cystoscopy
Urodynamics-prior to surgery

Review the abdomen: palpable bladder, masses in flanks
PV examination (chapteroned);
leakage on cough test from urethra
atrophic vaginitis, cystocele, ureterocoele, recto-coele.

Bladder diary-to assess fluid intake, symptoms experienced and
voided volume USS KUB-stones?,
any bladder masses?
Flexible cystoscopy-any bladder
tumours, CIS.

Suggested Reading

Management of Incontinence

Patient clinically has symptoms of incontinence

Stress incontinence
Conservative measures, weight loss, PFEx exercises with a physiotherapist, bladder retraining

Urodynamics prior to surgery. TVT, TOT.

Urge incontinence
Urge incontinence-conservative measures, cut out caffeine. Medical therapy for urgency-oxybutinin, toteradine, mirabegron.

Urodynamics prior to surgical therapy. Rigid Cystoscopy and Botox injections into detrusor muscle. Clam Augmentation cystoplasty.

Mixed incontinence
- treat the one that bothers the patient the most.

Very often, Urodynamics will confirm the most significant cause, whether stress or urge incontinence.

Suggested Reading


Priapism

Definition
- Persistence of an erection after cessation or removal of the stimulus that caused it.
- It can be painful, pulseless, and purple in colour.
- There are two types ischaemic or none ischaemic.
- It must be reversed within 6 hrs.
- Penile gangrene can be a complication (Ajape et al)
  - (Babcock et al)

Causes
- Sickle cell anaemia.
- Leukaemia, lymphoma, thalassaemia.
- Glucose 6 phosphate deficiency.
- Intracaverosal injections- alprostadil, caverject.
- Drugs- cocaine, chlorpromazine, clozapine.
- Spinal cord injury.
- Prostate cancer.
**History**
- Extent and duration of symptoms.
- Exacerbating factors. Prior history or shunts.
- Any drugs taken, anything applied to penis, foreign bodies eg penile rings etc.

**Examination**
- Examination of the abdomen, general medical exam
- Examination and grading of erection.
- Assess general fitness for anaesthetic.

**Investigations**
- Bloods inc WCC, crp, Renal functions, sickle cell screen, clotting.
- Blood gas from penis- is it ischaemic or none ischaemic.

**Management**
- Conservative measures- running up and down stairs, ice packs.
- Medical interventions
- Venflow- orange into each corpora bilaterally- blood aspirated (400 ml) and flush through with saline
- Take ABG of blood sample to determine if ischaemic or none ischaemic.
- If none ischaemic, use 0.1 ml of phenylephrine in 10 ml saline under cardiac monitoring into the corpora, instil in 50 microgram aliquots. Have an anaesthetist present.
- If fails- Winters or T shunt- using trus biopsy needle, puncture each corpora.
- If ischaemic, arterial embolisation.
- (Montague et al)
Suggested Reading

Diagnosis of Priapism

Patient presents with painful pulseless erection

History-Extent and duration of symptoms Exacerbating factors prior history or shunts LUTS, UTIS, haematuria Any drugs taken, anything applied to penis, rings etc

Bloods inc WCC, CRP, Renal functions, sickle cell screen, clotting Blood gas from penis-is it ischaemic or none ischaemic

Examination-Examination of the abdomen, general medical exam Examination and grading of erection

Conservative measures

Suggested Reading


Management of Priapism

Priapism clinically. Conservative measures—running up and down stairs, ice. Venflow—orange into each corpora bilaterally; blood aspirated (400 ml) and flush through with saline.

On blood gas, if none ischaemic, use 0.1 ml of phenylephrine in 10 ml saline under cardiac monitoring into the corpora, instil in 50 microgram portions.

If fails—Winters or T shunt—using TRUS biopsy needle, puncture each corpora. If ischaemic, arterial embolisation.

Suggested Reading


Penile Fracture

Definition
- Rupture of Bucks fascia that envelopes the corpora cavernosa with or without associated urethral injury.
- If there is haemturia there is associated urethral injury.
- Urethral injury may be complete or partial.
- Requires operative intervention to fix rupture.
  - (Haas et al)

Causes
- Intercourse where pressure is put on penis.
- Aggressive masturbation.
- Results in rupture of bucks fascia with involvement of the tunica.
Examination

- Review the abdomen: palpable bladder? retention.
- Blood at external urethral meatus? (urethral injury)
- Is there a palpable defect-break in Bucks fascia
- Egg plant sign-swollen bruised penis, painful.

History

- Extent and duration of symptoms
- Time of injury, time since injury
- Haematuria
- Any popping sound
- Pain
- Immediate detumescence
- Blood at the urethral meatus, retention
  (Mirzazadeh et al)

Investigation

- Urine dip and culture.
- Bloods-FBC, U+E, Clotting, G+S.
- USS penis or MRI penis (to look for break in tunica). Saglan et al, Merjadi et al.

Management

- Surgical exploration and repair.
- Consent to include circumcision, degloving of penile skin to base, identification and evacuation of haematoma and repair of defect in bucks fascia-consent should also include on table urethrogram and repair of urethral injury.
- Catheterise patient as part of procedure.
Suggested Reading


Zare MM, Darabi M, Bagheri SM, Kamali K, Bijan B. The role of ultrasound (US) and magnetic resonance imaging (MRI) in penile fracture mapping for modified surgical repair. Int Urol Nephrol. 2017;49(6):937–45.
Diagnosis of Penile Fracture

Patient presents to A+E will bruised, swollen penis post intercourse.

- Extent and duration of symptom
  - Time of injury—within 24 hours?
  - Haematuria
  - Any popping sound, pain, immediate detumescence

- Review the abdomen: palpable bladder? retention. Blood at external urethral meatus? (urethral injury)
  - Is there a palpable defect-break in Buck’s fascia.
  - Egg plant sign (Bruised swollen penis)

- Urine dip and culture
- Bloods
- USS penis/ MRI penis
- Keep patient NBM
Fig. 105.1  MRI demonstrating penile fracture

Suggested Reading


Zare MM, Darabi M, Bagheri SM, Kamali K, Bijan B. The role of ultrasound (US) and magnetic resonance imaging (MRI) in penile fracture mapping for modified surgical repair. Int Urol Nephrol. 2017;49(6):937–45.
Management of Penile Fracture

Patient clinically presents with penile fracture Confirmed on USS Penis or MRI Penis

If < 24 hours
Surgical exploration and repair
Circumcise the penis, deglove to the base, identify haematoma and evacuate.
The penile fracture will be beneath haematoma.
Repair with interupted none absorbable sutures.
In consent, warn of risk of ED and palpable sutures/

If > 72 hours
Conservative management
Antibiotics
Warn of risk of ED, that may require penile prosthesis.

If blood at meatus on examination, do on table urethrogram to identify urethral injury.
If unable to pass catheter, do not force, SPC and reconstruct urethra at a later date.

Circumcise the penis, deglove to the base, identify haematoma and evacuate.
The penile fracture will be beneath haematoma.
Repair with interupted none absorbable sutures. In consent, remember to mention circumcision, haematoma and palpable sutures.
Suggested Reading


Zare MM, Darabi M, Bagheri SM, Kamali K, Bijan B. The role of ultrasound (US) and magnetic resonance imaging (MRI) in penile fracture mapping for modified surgical repair. Int Urol Nephrol. 2017;49(6):937–45.
Phimosis

Definition

- Inability to retract foreskin.
- Tightening of foreskin on retraction around glans.
- Usually caused by BXO.
- Can often result in poor penile hygiene.

Causes

- Diabetes mellitus.
- BXO, thickened tight foreskin.
- Paediatric phimosis can occur, but do not confuse with physiological phimosis, where the foreskin has not fully developed yet (this should have occurred by the age of 5).
Examination

- Review the abdomen: palpable bladder, masses in flanks.
- Examine external genitalia for any masses (penile tumour).
- Get the patient to retract the foreskin back as far as they can—it is important to let them do this as it is painful on retraction.
- Some may not be able to retract at all, as the foreskin will be plastered to the glans.

Investigation

- Urine dip and culture
- Uroflowetry
- Bloods

Management

- If phimosis is present, and the patient is voiding, list for a circumcision under GA—especially in cases where the foreskin is none retractile, it can be a difficult dissection.
- Counsel the patient for complications of circumcision including poor cosmesis, penile curvature, glans sensitivity, wound complications, decreased sensation, decreased orgasmic sensation.
- In most cases like this a frenuoplasty will not work—the foreskin is tight and will not be relieved by a frenuloplasty.
- There is no such thing as a partial circumcision.

History

- Extent and duration of symptoms.
- Exacerbation—ripping, tearing and healing multiple times.
- Bleeding from torn foreskins.
- No LUTS, UTIS—check for retention.
- Past medical history DM, BKO treatment, steroids.

History

- Extent and duration of symptoms.
- Exacerbation—ripping, tearing and healing multiple times.
- Bleeding from torn foreskins.
- No LUTS, UTIS—check for retention.
- Past medical history DM, BKO treatment, steroids.
Suggested Reading


Diagnosis and Management of Phimosis

Patient presents with tight none retractile foreskin

History
- Bleeding from torn foreskins, pain on intercourse.
- Past medical history DM, BXO treatment, steroids.

Urine dip and culture

Uroflowetry

Bloods

Review the abdomen
- Examine external genitalis for any masses (penile tumour)
- Get the patient to retract the foreskin back as far as they can - it is important to let them do this as it is painful on retraction
- Ensure the patient is emptying their bladder

List for circumcision
- Complications - penile curvature, glans sensitivity, poor cosmesis, meatal stenosis, wound complications.

Suggested Reading


**Definition**

- Inability to retract foreskin due to swelling and oedema of the distal penile skin due to constriction.
- Often caused by the foreskin being retracted and not being replaced.
- It is a time critical event—the longer it remained unreduced, the more difficult it will be to reduce. (Olsen et al)

**Causes**

- None replacement of foreskin into normal anatomical position.
- E.g. post catheterisation, post intercourse.
- If prolonged, it can lead to gangrene, penile necrosis and amputation.
**Examination**

- Review the abdomen: palpable bladder?
- Examine the penis for masses.
- If the foreskin is retracted, assess extent and degree.

**History**

- Extent and duration of symptoms.
- Pain, LUTS, UTIS.
- Prior paraphimosis and reduction.
- Any attempt at reduction.

**Investigation**

- Urine dip and culture
- Uroflowmetry
- Bloods

**Management**

- Penile block-2% lidocaine without adrenaline in a circumferential block around penile base and to penile nerves (inject behind symphysis pubis).
- Attempt manual reduction-firm compression for reduction over 30 mins using palms of both hands-also try to pull the foreskin upwards.
- If fails try 20% dextrose solution and needle punctures to swollen area to reduce.
- If that fails, list for dorsal slit +/- circumcision under GA
- (Mackway-Jones et al, Yutaro et al).
Suggested Reading

Management of Paraphimosis

Patient post catheterisation-foreskin left retracted for 24 hours

- Penile block-2% lidocaine without adrenaline given after aspiration
- In a circumferential block around penile base and to penile nerves (inject behind symphisis publis)

- Attempt manual reduction-firm compression for reduction over 30 mins using palms of both hands-also try to pull the foreskin upwards

- If fails try 20% dextrose solution and needle punctures to swollen area to reduce

If that fails, list for dorsal slit +/- circumcision under GA, failure of reduction, without circumcision can lead to penile gangrene.
Suggested Reading

Erectile Dysfunction

Definition

• Inability to get an erection.
• Erection not sufficient for intercourse.
• Unable to complete intercourse satisfactorily.

Causes

• Diabetes.
• Cardiac disease-angiopathis, renal and liver disease.
• Obesity, high cholesterol, high BP.
• Neuropathic disease, neurogenic disorders.
• Medication: tamsulosin.
• Psychological disorders.
• Post operative, post radical prostatectomy, post turp
(Faysal et al), (Banks et al)
Erectile Dysfunction

History
- Grade erection-IIEF/SHIM Score.
- Extent and duration of symptoms.
- Nocturnal erections, general fitness (DM, cardiac, respiratory, liver or renal disease), other co-morbidities.
- Prior therapy and assessment.
- If post op-what procedure.
- History of neuropathy?

Examination
- Obs-blood pressure, heart rate, respiratory rate.
- Assessment of vascular disease.
- Examination of abdomen.
- Assessment of scrotum and testicular size (good sized testicles?) and presence of varicoceles.
- Penile assessment-penile plaques.
- ? General fitness and elevated BMI?
- Any neurological defect.
- DRE-prostate cancer present?

Investigation
- Bloods: TFTs, Testosterone, LH, FSH, SHBG, U+Es, glucose, PSA.
- USS Testes-to assess for underlying pathology.
- Urine dip and culture.

Management
- PDE 5 inhibitors, viagra, levitra, tadalafil.
- Vacuum pump device.
- Follow-up in an andrology clinic.
- 2nd line-caverject-alprostadil injection into corpora of penis or MUSE (intraurethral capsule).
- If these measures fail, consider penile prosthesis.
- (Pastuszak et al)
Suggested Reading


Diagnosis and Management of ED

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Patient presents to OPD with ED

History-Grade erection-IIEF
Nocturnal erections, general fitness other co-morbidities
Prior therapy and assessment

Bloods: TFTs, Testosterone, LH, FSH, SHBG, U+Es, glucose, PSA
USS Testes-to assess for underlying pathology
Urine dip and culture

Examination of abdomen
Assessment of scrotum and testicular size (good sized testicles?) and presence of varicoeles
Penile assessment-penis plaques? General fitness and elevated BMI?

PDE 5 inhibitors, viagra, levitra, tadalafil vacuum pump device
Follow-up in an andrology clinic
2nd line-caverject-alprostadil injection into corpora of penis if fails to consider penile prosthesis

Suggested Reading


Penile Cancer

Definition

- Presence of SCC in the penis.
- Due to a number of factors including presence of a foreskin.
- Organ sparing surgery is best, if the cancer stage allows.

Causes

- Presence of foreskin.
- Poor penile hygiene.
- Smegma.
- UV radiation.
- HPV types 16 and 18.
- (Hakenberg et al)
Examination

• Obs
• Chest, Abdominal examination.
• Presence of lesion on penis-depth of invasion and location—glans only, corpora, urethra, groin.
• Examination of groin for invasion and lymph nodes.

Investigation

• MRI pelvis including groin and abdomen.
• Urine dipstick.

Management

• If superficial disease, glansectomy and glansoplasty or CO2 laser and biopsy-Ta, TIS.
• If invading glans only, for partial penectomy
• If in the body of the penis invading the urethra, for penectomy and perineal urethrostomy.
• Hakkanson et al, Shabbir et al.
Fig. 113.1  Demonstrating penile cancer on glans

Fig. 113.2  MRI demonstrating penile cancer
Suggested Reading


Diagnosis of Penile Cancer

Patient presents with tight none retractile foreskin

Lesion
- Extent duration
- Lumps in groin
- Past circumcisions, Exposure to causative factors, ulceration

Presence of lesion on penis-depth of invasion and location-glands only, corpora, urethra, groin
- Examination of groin for invasion and lymph nodes

MRI pelvis including groin and abdomen/USS testes if MRI not available

Urine dipstick

Suggested Reading


MRI demonstrates penile cancer

- If superficial and not invading, glansectomy and glansoplasty
- If cancer present only on prepuce, list for circumcision
- If invading glans only, for Partial penectomy
- If in the body of the penis invading the urethra, for penectomy and urethrostomy
Suggested Reading


Fig. 115.1 Surgical appearance after partial penectomy
A Renal Mass

Definition

• A mass with the kidney that may be benign or malign
• Renal tumours are very often picked up as incidentalomas
• Patients may present with clot colic
• Renal masses can be biopsied to determine benign or malign nature. (EAU Guidelines)

Causes

• Oncocytoma
• Renal cell Carcinoma,
• TCC of the renal pelvis
• Renal cysts
• Renal Abcess
• Staghorn calculi
• None functioning kidney
History

- Extent and duration of symptoms
- Pain
- A renal mass
- Flank pain (clot colic)
- Weight loss
- Bony aches (hypocalcaemia), respiratory symptoms (chest mets)
- Red appearance (malar flush)
- Left sided varicocele (If tumour invades the renal vein on the left)

(Pallwein-Prettner et al, Corcoran et al).

Fig. 116.1  CT demonstrating a right sided renal mass

Fig. 116.2  A cystic renal mess on USS and CT
**Fig. 116.3** A CT demonstrating different phases with a renal mass

**Fig. 116.4** An oncocytoma (benign renal mass) on CT
Fig. 116.5  A pathological specimen of oncocytoma

Fig. 116.6  An angiomyolipoma on CT with contrast (a and b) and none contrast (c–d) windows
Fig. 116.7  An angiomyolipoma on pathology axial view (section a) and external view (section b)


Management Pathway for Renal Mass

1. Patient with renal mass on CT
   - If mass is not diagnostic on CT, biopsy or multiple masses, or single functioning kidney, consider a renal biopsy

2. For Ta/T1 disease
   - Active Surveillance or RFA/cryotherapy (thermal ablation) if not fit for surgery

3. For T1-T2 disease, <7 cm in anatomically favourable locations
   - Consider Open or lap/robotic partial nephrectomy

4. For T3 disease
   - If fit consider radical nephrectomy
   - If not fit consider referral to oncology
Fig. 117.1 Demonstrating percutaneous thermal ablation—CT guided

Fig. 117.2 Demonstrating renal biopsy via US guidance
Suggested Reading


118A Painful Scrotum

Definition

- Pain within the contents of the scrotum.
- The scrotum contains the testes, the epididymis, the spermatic cord contents including the vas, the pampiniform plexus of veins, the testicular artery and artery to the vas, lymph nodes.
- Try to localize the pain to an anatomical location.
- Be wary of torsion in the neonatal and 10-20 year old age group.
- When in doubt, explore.
- (Pogorelic et al).

Causes

- Testicular torsion
- Epididymoorchitis
- Epididymal cysts
- Hydrocoele
- Varicocele
- Necrotising fasciitis
- Chronic scrotal pain
- Referred pain from the perineum
• Extent and duration of symptoms.
• Pain-when did it start? Does it radiate?
• Is it intermittent? lying higher?
• Is the testicle tender (Torsion).
• Change in appearance of the scrotum-swelling, erythema, redness, skin changes (black or necrotic).
• Associated urinary symptoms, LUTS, dysuria, retention.
• Trauma history.
• Prior scrotal fixation.

• Obs-blood pressure, heart rate, respiratory rate.
• Assessment of abdomen-ureteric colic, appendicitis, can present as scrotal pain.
• Palpable bladder-retention.
• Examine testicles lying and standing.
• Look for normal lye, pain (localised to anatomical location), cremasteric reflex, Prehns sign (if infective cause, pain will reduce with support to testicle), cord tenderness and high lying testicle (torsion), enlarged swollen testicle (epididymo-orchitis). Transilluminate testicle (illumination-hydrocoele).

• Bloods: FBC, renal function, crp and clotting.
• Urine dip and culture.
• USS testes if epididymo-orchitis, hydrocoele or trauma.
• If torsion is suspected and has been present for greater than 24 hours-USS testes to see if the testicle is viable.
• (D’Andrea et al)

• Testicular torsion <24 hours-surgical exploration.
• Epididymo-orchitis-medical management-antibiotics, send off culture and scrotal support-can take up to 6 weeks to resolve
• Hydrocoele-Jaboulay or Lords Plication.
• Testicular trauma-if tunica is breached on USS testes, for scrotal exploration and closure.
• Necrotising fasciitis-immediate surgical debridement with General Surgical team (in case of stoma formation).
• Chronic scrotal pain-look and ensure patient is emptying bladder, then refer to pain clinic.
• (Ta et al)
Suggested Reading

Diagnostic Pathway: A Painful Scrotum

Patient presents with a painful scrotum

Focused history—pain, extent, LUTS, Haematuria, UTI, dysuria, trauma, scrotal surgery.

Past history of scrotal surgery or fixation, past history of tumour or orchidectomy, past history of urology admissions.

Examination—testicular/epidymal/cord pain, lye of testicles (if horizontal, torsion), high lying testicle, swelling of testicle, abnormal skin discolouration, transillumination.

Investigations: bloods, urine dip and culture, USS testes if epididymo-orchitis.

Fig. 119.1 USS of epididymo-orchitis and a hydrocele
Suggested Reading

Management Pathway: A Painful Scrotum

Painful scrotum

- Testicular torsion-high lying testes, absent cremasteric reflex, swollen tender testicle
  - Surgical exploration +/- bilateral fixation +/- orchidectomy

- Epididymoorchitis-tender swollen erythematous testicle, with associated dysuria and positive dip
  - Medical therapy-antibiotics as per trust protocol, IV fluids scrotal support.
  - Can take up to 6 weeks to resolve.

- Hydrocoele-rule out not tumour is causing hydrocoele, with clinical exam and USS testes.
  - If patient is symptomatic, book for hydrocoele repair (Jaboulays Excision of sac or Lords Plication)

Suggested Reading

Scrotal Lesions

Definition

- A mass within the scrotum.
- This may be painful or painless with associated symptoms.
- Patients may have this for a prolonged period of time prior to realising it is present.
- It is important to rule out testicular tumour in young males, and also for tender testicles, the management of torsion.

Causes

- Benign:
  - Epididymal cysts
  - Hydrocele
  - Varicocele
  - Testicular cysts
  - Lipoma of the cord
  - Inguinal hernia
- Malign
- Testicular cancer
Examination
- Obs-blood pressure, heart rate, respiratory rate
- Chest assessment-metastases or pleural effusion
- CVS assessment-? Septic
- Examination of abdomen-palpable bladder or renal mass
- Scrotal examination-pain, lesion, size, anatomical location-? abnormal testicles, transillumination (hydrocoele), cough reflex-varicocele.

Investigation
- Bloods: FBC, renal function, crp, calcium, esr.
- USS to assess scrotal contents.
- Urine dip and culture.
- Bladder scan to assess post void residual.

Management
- Epididymal cysts-if patient has not completed family, pain relief (risk of strictures, and infertility), if family completed and patient has enlarged cyst which is symptomatic, excise.
- Hydrocoele-if enlarged and patient has significant pain, list for repair, but warn against risk of recurrence.
- Varicocele-emboise if patient is symptomatic.
- Lipoma of the cord-excise for cosmetic purposes.
- Inguinal hemia-refer to general surgeons for repair.

History
- Extent and duration of symptoms
- Painful or Pain less
- Extent and duration of mass
- Change in mass Weight loss
- Urinary symptoms-LUTS, dysuria, haematuria, UTI, AUR
- Red flag signs-weight loss, lymphadenopaty, chest symptoms
- Prior surgery or urological history
Suggested Reading

Diagnostic and Management Pathways: 
Scrotal Lesions

Scrotal lesion 
USS tests and clinical diagnosis

- **Epididymal cysts**
  - If family complete-list for excision

- **Hydrocoele**
  - If symptomatic and enlarged, consider for Lorde’s or Jaboulay’s procedure (aspiration leads to recurrent hydrocoele

- **Varicoele**
  - If symptomatic or infertile, consider treatment with embolisation

Testicular cysts/Lipoma of cord-tend to observe, although can be surgically excised for cosmetic purposes

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