Urology provides critical medical treatment that has the potential to save lives and greatly improve quality of life. Although there is a growing need for urological care, South Africa (SA) now faces an unmet need for these services, and junior doctors have limited exposure to urology. SA has a total of 347 urologists who are actively practising and registered with the Health Professions Council of South Africa. This means that there is a ratio of only 0.56 urologists per 100 000 people in the population. The ratio is even more dire if we only include urologists in the public sector. This article offers pragmatic strategies for addressing common urological conditions. These guidelines adhere to international standards and can be adopted at all levels of healthcare, with the exception of a few advanced imaging needs.

Urology pathways for the primary care physician

J John, FC Urol (SA), MMed

Division of Urology, Department of Surgery, Frere Hospital and Faculty of Medicine and Health Sciences, Walter Sisulu University, East London, South Africa; Division of Urology, Department of Surgery, Faculty of Health Sciences, University of Cape Town, South Africa

Corresponding author: J John (jeffveenajohn@gmail.com)

Urology, the oldest of the surgical specialties, delivers care that has the potential to be lifesaving and has the capacity to significantly enhance quality of life. However, there is currently an unmet demand for urological services in South Africa (SA). SA currently has only 347 active urologists registered with the Health Professions Council of South Africa, a dire urologist-to-population ratio of 0.56 per 100 000.1 Furthermore, 52 million people who fall outside the medical aid net2 are dependent on just 50 full-time urologists in the public sector across the country.3 Waiting lists continue to grow, and the status quo is inadequate to meet the demand. However, these issues are not unique to SA. In theory, National Health Insurance aims to provide equitable access to healthcare and general practitioners and primary care physicians, often described as the jewel in the crown of the National Health Service in the UK,4 will have an increasing role in managing common urological conditions here. This article provides practical, cost-effective diagnostic pathways, which are in line with international guidelines5-7 to approach common urological presentations and, except for a small number of advanced imaging requirements, can be implemented at all levels of care.

Declaration. None.

Acknowledgements. The author gratefully acknowledges comments and suggestions from Kerisha Bhana, Noma Mngqi, Bernard Marais, Kaylyn Stride and Niân van Jaarsveld (Frere Hospital, East London), Ntuthuzelo Lusawana and Lonwabo Gqoli (Walter Sisulu University), John Lazarus and Lisa Kaestner (University of Cape Town), Ahmed Adam (South African Urological Association and University of the Witwatersrand), Shingai Mutambirwa (South African Urological Association and Sefako Makgatho Health Sciences University), Greg Webb, David Smart Karheinz Jehle, James Urry, David Mouton (South African Urological Association), and Shauli Minkowitz.

Author contributions. Sole author.

Funding: None.

Conflicts of interest: None.


Erectile Dysfunction (ED)

Young patient with a history of trauma to the genitalia and/or any penile or testicular abnormalities on clinical examination?

Is the cause likely to be predominantly psychogenic?

Young patient with acute onset ED that may be situational
Good non-coital rigidity
History of psychosexual or relationships problems (that is not related to ED)

NO

YES

BP/BMI/Weight/Abdominal circumference
HbA1C, Lipid profile
Encourage weight loss
Advise smoking cessation
Increase physical activity
Optimise medical co-morbidities
Consider discontinuing medication known to cause ED

NO

YES

Testosterone (before 10 am)
If low, do FSH, LH, TSH and Prolactin

Hormonal profile abnormal?

NO

YES

Patient known with coronary heart disease (CHD)?

NO

YES

Initiate PDE5-I therapy

Refer to Urology

Guidance from Cardiology/Medicine

Refer to Endocrinology/Medicine

NO

YES

Education and counselling, with partner, if available
Re-enforce behavioural and lifestyle modifications
Discharge from care

Education and counselling, with partner, if available
Re-enforce behavioural and lifestyle modifications
Discharge from care

Psycho/sexual therapy

NO

YES

Testosterone (before 10 am)
If low, do FSH, LH, TSH and Prolactin

Hormonal profile abnormal?

NO

YES

Patient known with coronary heart disease (CHD)?

NO

YES

Initiate PDE5-I therapy

Refer to Urology

Guidance from Cardiology/Medicine

Reference from Endocrinology/Medicine

Pharmacological failure?
Counsel patient to take the medication at least eight times at the maximum dose of the drug, 1 hour before sex, ideally on an empty stomach together with sexual stimulation before it is deemed a pharmacological failure.

### Tadalafil (Cialis)

- **Onset of action**: 15 minutes - 2 hour
- **Half-life**: 17.5 hours
- **Food effect**: None
- **Dosages**: 5, 10, 20 mg
- **Side effects**: Headache, dyspepsia, facial flushing, rare cause of blurred/blue vision, backache and myalgia
- **Contraindications**: Nitrates, antiarrhythmics

### Vardenafil (Levitra)

- **Onset of action**: 15 minutes - 1 hour
- **Half-life**: 4 - 5 hours
- **Food effect**: Reduced absorption with fatty foods
- **Dosages**: 5, 10, 20 mg
- **Side effects**: Headache, dyspepsia, facial flushing, rare cause of blurred/blue vision, backache and myalgia
- **Contraindications**: Nitrates, antiarrhythmics

### Sildenafil (Viagra)

- **Onset of action**: 15 minutes - 1 hour
- **Half-life**: 3 - 5 hours
- **Food effect**: Reduced absorption with fatty foods
- **Dosages**: 25, 50, 100 mg
- **Side effects**: Headache, dyspepsia, facial flushing, rare cause of blurred/blue vision, backache and myalgia
- **Contraindications**: Nitrates
Urinary incontinence in the female

Any red flags?
- Haematuria
- Recurrent documented, symptomatic UTIs
- Urinary retention
- Voiding difficulty
- Elevated postvoid residual volume (> 150 mLs)
- Suspected fistulae
- Incontinence with new-onset neurological symptoms
- Bladder/urethral pain associated with incontinence
- Previous continence surgery
- Previous pelvic surgery or radiation
- Pelvic organ prolapse past the introitus

Reversible causes treated?
- D Delirium, dementia or other confusional states
- I Infections
- A Atrophic vaginitis
- P Psychological causes
- P Pharmacological (narcotics, diuretics, sedatives)
- E Endocrine disorders, excessive fluid intake
- R Restricted mobility
- S Stool impaction

Discharge from care
Education and counselling with special reference to avoid any precipitants

Symptoms improved?
- NO
- YES

Urinary incontinence

Stress incontinence
- Lifestyle modifications
  Three months supervised physiotherapy (8 contractions, three times a day)

Overflow incontinence
- Consider initiating anti-cholinergics or β3 agonists
  - Oxybutynin 5 mg daily/12-hourly oral dose
  - Solifenacin 5mg/10mg daily oral dose
  - Mirabegron 50 mg daily oral dose

Urge incontinence
- Lifestyle modifications
  Three months bladder re-training and pelvic floor exercises
  Consider local hormonal replacement therapy

Mixed incontinence
- Treat predominant symptom

Classify incontinence and manage conservatively

Symptoms persist?
- NO
- YES

Lifestyle modifications
Three months supervised physiotherapy (8 contractions, three times a day)

Refer to Urology or Uro-gynaecology (as per regional policy)

YES

Education and counselling
Encourage physical activity and weight loss
Encourage cessation of smoking
Limit bladder irritants (caffeine, carbonated drinks)
Limit fluid intake before bed/leaving the house
Adjust timing of diuretic intake

YES

YES

Any red flags?

YES

Possible causes:
- Stress incontinence
- Overflow incontinence
- Urgent incontinence
- Mixed incontinence

Symptoms improved?

YES

YES

NO
Adult male lower urinary tract symptoms (LUTS) and signs suggestive of benign prostatic enlargement (BPE)

Any red flags?
- Macroscopic/visible haematuria
- Recurrent culture proven urinary tract infections
- Bladder stones
- Renal dysfunction with bilateral hydronephrosis on KUB ultrasound

NO

Education and counselling
- Encourage physical activity and weight loss
- Encourage cessation of smoking
- Limit bladder irritants (caffeine, carbonated drinks)
- Limit fluid intake before bed/leaving the house
- Adjust timing of diuretic intake

Symptoms persist?

NO

Education and counselling with focus on re-enforcing behavioural and lifestyle modifications

YES

Is patient bothered by his symptoms?

NO

Predominantly storage (frequency, urgency, nocturia, urge incontinence) symptoms and negligible post micturition residual volume?

NO

Initiate alpha blockers
- Tamsulosin 0.4 mg daily oral dose
- Doxazosin 4 mg daily oral dose

YES

Initiate anti-cholinergics or β3 agonists
- Oxybutynin 5 mg daily/12-hourly oral dose
- Solifenacin 5mg/10mg daily oral dose
- Mirabegron 50 mg daily oral dose

Symptoms improved?

YES

Residual storage symptoms

Refer to Urology

NO

Residual voiding ± storage symptoms

NO

NO
Elevated PSA on screening of asymptomatic patients

Any of the following risk factors that may transiently elevate PSA?
(acute urinary retention, prostatitis, urinary tract infection, recent urethral instrumentation or transurethral resection of the prostate?)

YES

PSA elevated but < 10 ng/mL

Repeat PSA in 6-8 weeks

Refer to Urology

Still elevated?

YES

NO

45 - 49 years

PSA < 1 ng/ml
Repeat PSA after 2 years

PSA 1 - 2.5 ng/ml
Repeat PSA after 1 year

50 - 59 years

PSA < 1 ng/ml
Repeat PSA after 2 years

PSA 1 - 3.5 ng/ml
Repeat PSA after 1 year

60 - 70 years

PSA < 1 ng/ml
Repeat PSA after 2 years

PSA 1 - 4.5 ng/ml
Repeat PSA after 1 year

> 70 years OR
life expectancy
< 10 years

Discontinue screening

Only offer PSA screening to well informed men, where the benefit of screening and subsequent treatment will outweigh its harm/risks i.e. in patients > 70 years or patients with < 10 years life expectancy, PSA screening is unlikely to benefit the patient.

Any of the following risk factors that may transiently elevate PSA?
(acute urinary retention, prostatitis, urinary tract infection, recent urethral instrumentation or transurethral resection of the prostate?)

OR

PSA elevated but < 10 ng/mL

Repeat PSA in 6-8 weeks

Refer to Urology

Still elevated?

YES

NO

45 - 49 years

PSA < 1 ng/ml
Repeat PSA after 2 years

PSA 1 - 2.5 ng/ml
Repeat PSA after 1 year

50 - 59 years

PSA < 1 ng/ml
Repeat PSA after 2 years

PSA 1 - 3.5 ng/ml
Repeat PSA after 1 year

60 - 70 years

PSA < 1 ng/ml
Repeat PSA after 2 years

PSA 1 - 4.5 ng/ml
Repeat PSA after 1 year

> 70 years OR
life expectancy
< 10 years

Discontinue screening
Non-visible Haematuria

Any clinical features of urinary tract infection?

Send midstream urine for microscopy, sensitivity and culture

Is the patient symptomatic? i.e. LUTS

Culture positive?

Initiate culture-directed antimicrobial therapy

Non-visible haematuria persists after appropriate treatment?

If any high-risk features for urological malignancy, patient requires concurrent urology review?

Urinalysis confirms ≥ 3 red blood cells on two separate specimens?

Discharge from care

Use opportunity for health education

BP > 140/90 mmHg

eGFR < 60 mL/min/1.73 m²

ACR > 30 or PCR > 50

Evidence of sickle cell disease

Refer to Urology

Refer to Medicine/Nephrology

Any clinical features of urinary tract infection?

Age > 40 years

Smoker

Personal/family history of urological malignancies

Occupational exposure to urothelial carcinogens (painters, metal workers, rubber manufacturers)

Previous pelvic radiation

Chronic inflammation of urinary tract (calculi, schistosomiasis, long term indwelling catheter)
Visible Haematuria

Is the patient passing large clots? Is the patient in clot retention? Is the patient on anticoagulants with an elevated INR? Is the patient suffering systemic compromise?

NO

YES

Any clinical features of urinary tract infection?

YES

Send midstream urine for microscopy, sensitivity and culture (if terminal haematuria, send off specimen between 10:00-14:00 to look for schistosomiasis)

Culture positive?

YES

Initiate culture-directed antimicrobial therapy

NO

Haematuria persists after appropriate treatment

refer to urology

Any high-risk features for urological malignancy?

Age > 40 years
Smoker
Personal/family history of urological malignancies
Occupational exposure to urothelial carcinogens (painters, metal workers, rubber manufacturers)
Previous pelvic radiation
Chronic inflammation of urinary tract (calculi, schistosomiasis, long term indwelling catheter)

NO

Discharge from care
Use opportunity for health education with specific reference to cessation of smoking

YES
Male urethral discharge

Ceftriaxone 250 mg IM as a single dose
AND
Azithromycin 1g PO as a single dose

Sexual abstinence until after resolution of symptoms
Refer sexual partners for emperic treatment
Recommend testing for other STIs and HIV

Persistent symptoms after 7 days?

NO

Discharge
Use opportunity for health promotion and education

YES

Ceftriaxone 1 g IM as a single dose
AND
Azithromycin 2 g PO as a single dose
AND
Metronidazole 2 g PO as a single dose

Still persistent symptoms?

NO

YES

Refer to Urology
Acute scrotal pain and swelling in an adult male

**Testicular torsion, necrotizing fascitis, incarcerated hernia or other acute abdominal processes excluded?**

**Clinical suspicion of abscess?**

**Yes**
- Incision and Drainage

**No**
- Urine dipstick
  - Midstream urine for culture
  - First-voided urine for nucleic acid amplification for C. Trachomatis ± N. Gonorrhoea

**High risk of sexually transmitted infections? i.e. presumed STI related**
- Under 40 years of age
- High risk sexual history
- Mucoid/purulent urethral discharge
- Urine dipstick positive for leucocytes only

  - Ceftriaxone 1g IM as a single dose
  - Azithromycin 1g PO as a single dose

  - Sexual abstinence until after resolution of symptoms
  - Refer sexual partners for treatment
  - Recommend testing for other STIs and HIV

**Low risk of sexually transmitted infections? i.e. presumed UTI related**
- Over 40 years of age
- Low risk sexual history
- No mucoid/purulent urethral discharge
- Urine dipstick positive for nitrites + leucocytes

  - Ciprofloxacin 500 mg PO 12 hourly (10-14 days)

**Signs and symptoms improving?**

**Yes**
- Discharge from care
  - Use opportunity for health promotion and education

**No**
- Check compliance with treatment
  - Check sexual abstinence
  - Ensure sexual partners have been treated

- Send off 5 early morning urines on 5 consecutive days for AFB and TB culture
- Scrotal ultrasound
- Refer to Urology
Acute urinary retention (palpable, painful bladder with a desire to void, but unable to do so)

- Initiate immediate bladder drainage with urethral catheter
  - Insert suprapubic catheter
    - Attempt successful?
      - YES
        - Any reversible precipitants of acute urinary retention identified?
          - NO
            - Normal eGFR and negligible post-micturition residual (PMR) volume
              - YES
                - Benign prostatic enlargement on clinical examination?
                  - NO
                    - Refer to Urology
                  - YES
                    - Initiate alpha blockers
                      - Tamsulosin 0.4 mg daily oral dose
                      - Doxazosin 4 mg daily oral dose
                      - Trial of voiding without catheter in 2 - 4 weeks
            - NO
              - Manage precipitant and attempt trial without catheter in 3 days
              - Trial successful?
                - YES
                  - Reassure
                    - Education and counselling with special reference to avoid any precipitants
                  - Trial successful?
                    - YES
                      - Continue treatment
                    - NO
                      - Manage precipitant and attempt trial without catheter in 3 days
        - NO
          - YES
            - Normal eGFR and negligible post-micturition residual (PMR) volume
              - YES
                - Benign prostatic enlargement on clinical examination?
                  - NO
                    - Refer to Urology
                  - YES
                    - Initiate alpha blockers
                      - Tamsulosin 0.4 mg daily oral dose
                      - Doxazosin 4 mg daily oral dose
                      - Trial of voiding without catheter in 2 - 4 weeks
              - NO
                - Manage precipitant and attempt trial without catheter in 3 days
                - Trial successful?
                  - YES
                    - Reassure
                      - Education and counselling with special reference to avoid any precipitants
                  - Trial successful?
                    - YES
                      - Continue treatment
                    - NO
                      - Manage precipitant and attempt trial without catheter in 3 days
              - YES
                - Trial successful?
                  - YES
                    - Continue treatment
                  - NO
                    - Manage precipitant and attempt trial without catheter in 3 days

If urine output is > 200 mL for at least two consecutive hours immediately following the relief of urinary retention - consider 24-hour hospitalisation for close monitoring of urine output and electrolytes. IV fluid support should be normal saline and limited to no more than 75% of the prior 1 to 2-hour urine production to avoid stimulation of further diuresis.