

# FOUNDATION YEARS JOURNAL

APRIL 2011

Volume 5, Issue 3: Urology



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Volume 5, Issue 3

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## CASE-BASED DISCUSSION – URINE DIPSTICKS

Zara Gall, Ann Crump

Case-Based Discussion – Urine Dipsticks.  
Good Clinical Care.

## Abstract

The urine dipstick is a common investigative tool used in all branches of medicine. It detects a number of different substances in the urine through a series of chemical reactions.

This series of Case-Based discussions aims to provide a framework of what to do when faced with various urine dipstick results.

**Commonly detected substances and the reason for detection are noted below:**

Red Blood Cells detected due to haemoglobin reacting with a chromogen indicator, Leucocytes leukocyte esterase catalyses the production of indoxyl which oxidises a diazonium salt leading to an indigo colour change, Nitrites normally not present causes the formation of a red azo dye, Glucose reacts with glucose oxidase to form hydrogen peroxide which leads to a colour change, Ketones tests for presence of >5 mg/dl of acetoacetic acid, and Protein a tetrabromophenol blue dye turns green, if >20 mg/dl protein present.

The table below shows possible reasons for errors of urine dipsticks:

<b>Red Blood Cells</b>	detected due to haemoglobin reacting with a chromogen indicator
<b>Leucocytes</b>	leukocyte esterase catalyses the production of indoxyl which oxidises a diazonium salt leading to an indigo colour change
<b>Nitrites</b>	not normally present. Causes the formation of a red azo dye
<b>Glucose</b>	reacts with glucose oxidase to form hydrogen peroxide which leads to a colour change
<b>Ketones</b>	tests for presence of >5mg/dl of acetoacetic acid
<b>Protein</b>	a tetrabromophenol blue dye turns green if >20mg/dl protein present



## Cases

As in all patients it is important to perform a thorough assessment including a history and appropriate examination.

## Presenting Problems

**1. Red Blood Cells are detected**

a) A 55 years old woman attends her GP surgery as part of a well-woman clinic. She is normally well and has no symptoms. As part of her routine investigations a urine dipstick is performed. This shows a trace of blood.

## What would you do next?

In the presence of haematuria it is important to ascertain if it is Visible Haematuria (VH) or Non Visible Haematuria (NVH) and also if there are associated symptoms. With regards to the urine dipstick if the patient has not noticed any VH herself no further action needs to be taken. The Joint Consensus Statement on the Initial Assessment of Haematuria states that a trace of haematuria on urine dipstick should be considered negative.

b) A 40 years old man is being assessed in a pre-operative clinic prior to an inguinal hernia repair. He has no urological symptoms. As part of routine investigations he has a urine dipstick test. This shows 1+ blood.

## What would you do next?

The important point here is that he is asymptomatic. A urine dipstick which is 1+ or greater is considered significant but if he is asymptomatic, as in this case, his dipstick needs to be repeated. The result is only considered significant and requiring urological referral if the result is persistent. This means that 2 out of 3 dipsticks would show positivity for NVH. This is different from a symptomatic patient when a single episode of NVH is considered significant (in the absence of UTI/menstruation).

**Assuming that this man has persistent asymptomatic NVH what further investigations would you undertake?**

- Blood pressure
- MSSU – to exclude a urinary tract infection
- Plasma Creatinine/eGFR
- Protein Creatinine Ratio (PCR) or
- Albumin Creatinine Ratio (ACR) on a random sample

## CASE-BASED DISCUSSION – URINE DIPSTICKS

Zara Gall, Ann Crump

### Case-Based Discussion – Urine Dipsticks. Good Clinical Care.

When would you consider referring him to the local urological service?

**The following patients should be referred:**

- a) All patients with visible haematuria (any age)
- b) All patients with symptomatic NVH (any age)
- c) All patients with asymptomatic NVH aged >40 years

**2. Protein is detected**

A 45 year old woman has a urine dipstick test as part of her assessment for life insurance. She was told there that she has 1+ of protein on her urine dipstick and was advised to see her GP. She is now sitting in your surgery.

What will you do now?

First of all repeat the dipstick. At least 3 samples should be checked to see whether there is persistence of proteinuria. 1+ of proteinuria roughly equates to 30 mg/dl. Just be aware though that dipsticks will detect albumin but not Bence Jones' protein or D-globulins. Her proteinuria is persistent.

What important thing would you ask for in your history?

Ensure you include past medical history (e.g., diabetes, myeloma), family history, medications and occupational history (industrial/environmental exposures to old paint etc. for heavy metal poisoning).

What investigations would you do next?

- Blood pressure
- MSSU
- Urea and electrolytes and PCR
- Fasting blood glucose and cholesterol
- Urinary ratio of protein to creatinine



When would you consider referring to Nephrologist?

If urinary protein/creatinine ratio > 30 mg/mmol (ACR) or >50 mg/mmol (PCR).  
If GFR declining (either >10 ml/min over 5 years or >5 ml/min over last year).  
If CKD Stage 4 or 5 (eGFR <30 ml/min).  
Hypertension presented in patient <40.  
VH coinciding with inter-current infection (URTI).  
Normally, if VH present a urological opinion should be sought first.

Leucocytes and nitrite positive

a) A 50 years old man presents with dysuria, frequency and urgency. He has noticed that his urine smells offensive.

What points are important in the history?

It is important to find out, if this is a first episode of infection or a recurrent infection. In order to assess whether this is a lower or upper lower urinary tract infection you should ask about the presence of loin pain, fever, rigors or vomiting. The likely aetiology in a 50 year old man is that he may have bladder outflow obstruction leading to poor bladder emptying. It is therefore important to ask about hesitancy, poor flow, post-micturition dribble and a feeling of incomplete emptying in weeks or months prior to the infection.

What investigations are you going to perform?

**Urine Dipstick and MSU**

This gentleman's dipstick shows Blood +, nitrites positive and leucocytes +++. He has not had any systemic symptoms but has noticed a worsening of his flow and some hesitancy over the last 6-12 months.



## CASE-BASED DISCUSSION – URINE DIPSTICKS

Zara Gall, Ann Crump

### How are you going to manage him?

The combination of his symptoms and his dipstick is strongly suggestive of a lower UTI so he needs a 7–10 days course of oral antibiotics. An MSU should also be sent to document the presence of a UTI and to guide treatment, if he fails to respond to the initial course. He could also be commenced on an alpha-blocker to improve his bladder emptying. A follow-up appointment should be offered to ensure that his urine infection has cleared (by re-dipsticking his urine) and to assess how troublesome his Lower Urinary Tract Symptoms (LUTS) are. If he continues to have LUTS or if he has recurrent infections, he should be referred to Urology for further assessment.

### Discussion

The choice of antibiotics should be guided by the local micro-biologists advice based on local resistance patterns of urinary pathogens. A 3 days course is usually sufficient to treat an uncomplicated infection in a woman or a child of over 3 months. Any complicated infection requires a 7–10 days course. Any complicated infection includes all upper urinary tract infections, all infections in men and all infections in those with a structural or functional abnormality of the renal tract. Remember that nitrofurantoin should not be used in those with renal impairment as it does not reach effective concentrations in the urine.

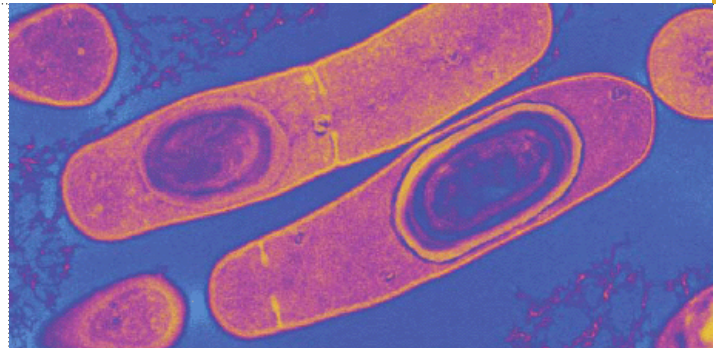
b) A 60 years old catheterised lady with multiple sclerosis recently attended a neurology clinic, where a routine dipstick was performed. She was told that her urine was positive for infection and she has now come to you for advice and treatment. The dipstick today shows nitrite positive and leucocytes +++.

### What are you going to ask in the history?

The most important fact to ascertain is whether or not she has any symptoms. Ask about the presence of bladder irritation, loin or suprapubic pain, fevers, confusion or other signs of infection.

She denies any urinary symptoms and has been well recently. What investigations will you perform?

This lady does not require an MSU, as she has Asymptomatic Bacteriuria which is very common in those with catheters. There is no value in documenting the presence of infection if you are not planning to treat it.



### Discussion

Asymptomatic Bacteriuria only requires antibiotic treatment when there is convincing evidence that the benefit of eradicating the Bacteriuria outweighs the risk. In healthy women, the prevalence of Bacteriuria increases with age, from about 1% in 5–14 years, upto >20% in those  $\geq$  80 years old. All patients with a long term indwelling catheter are Bacteriuric, as the catheter provides a focus for bacterial bio-film formation. It is not possible to eradicate the Bacteriuria and in the absence of symptoms, the risk of harm from a course of antibiotics outweighs the risk of benefit. In elderly patients, asymptomatic Bacteriuria is common and there is evidence that treatment is more harmful than beneficial. Similarly, treating asymptomatic Bacteriuria in diabetics has not been found to improve outcomes.

In contrast, during pregnancy there is evidence that treatment of Bacteriuria does more good than harm. Women with asymptomatic Bacteriuria in pregnancy are more likely to deliver pre-mature or low birth weight infants and have a 20–30 fold increased risk of developing pyelonephritis.

Asymptomatic Bacteriuria should also be treated prior to TURP, traumatic urological interventions or prosthesis surgery.

### References

1. Joint Consensus Statement on the Initial Assessment of Haematuria – prepared on behalf of the Renal Association and the British Association of Urological Surgeons July 2008.
2. John Reynard, Simon Brewster and Suzanne Biers. Urine dipsticks in Oxford Handbook of Urology 2nd end 2010.

## CASE-BASED DISCUSSION – URINE DIPSTICKS

Zara Gall, Ann Crump



### Self Assessment Best of Five Questions

**1) A 36 years old male angler who smokes 30 cigarettes per day presents with increased frequency of micturition and some urinary urgency. On dipstick he has blood ++ but no nitrites or leucocytes. You send the urine sample for culture. He denies any visible haematuria. How will you manage this patient?**

- Refer to Nephrologists
- Refer to Urologists
- Treat with antibiotics
- Start an anti-cholinergic for presumed overactive bladder syndrome
- Reassure and discharge

**2) A 20 years old female presents with a two day history of frequency, urgency, dysuria and suprapubic pain. She is systemically well and has no loin pain. Her dipstick shows Blood +++, leucocytes +++, nitrite positive and protein +. How will you manage this patient?**

- Send MSU and wait for results prior to treatment
- Treat with 7 days of oral antibiotics and don't send MSU
- Treat with 3 days of oral antibiotics and don't send MSU
- Send MSU and give a 3 day course of empirical oral antibiotics
- Send MSU, treat with 3 days of oral antibiotics and refer to Urology

### Answers

#### 1) b

This gentleman has symptomatic non-visible haematuria and therefore requires urgent urological referral despite his young age (see Joint Consensus on the Initial Management of Haematuria). The differential diagnosis includes UTI so it was wise to send the MSU, but in the absence of leucocytes or nitrites he should not be started on antibiotics empirically. His storage symptoms (frequency and urgency) might be due to overactive bladder syndrome, but in the presence of microscopic haematuria it is essential to rule out neoplastic causes first. Bladder tumours and in particular carcinoma in-situ of the bladder can give rise to irritative urinary symptoms. He is at higher risk of transitional cell carcinoma due to his smoking history and also possibly due to his angling; anglers often use dyed maggots as bait and some warm these dyed maggots in their mouths to make them wriggle more and be more attractive to the fish. The dye which is absorbed through the mucous membranes in the mouth is carcinogenic, predisposing them to TCC.

#### 2) c

This young woman's symptoms in combination with her dipstick results are strongly suggestive of a UTI and she should be commenced on antibiotics without delay. The choice of antibiotic should be based on the recommendations of the local microbiology centre. A 3 day course is usually sufficient in an uncomplicated lower urinary tract infection in a woman. If an MSU is not sent at presentation and the patient continues to be symptomatic, an MSU sent after treatment with antibiotics is often not helpful, so the opportunity to get the true sensitivities has been lost. Also, if the only MSUs sent to the lab are those that don't respond to treatment, this will skew the apparent resistance patterns of urinary pathogens. However, UTIs in young women are very common and usually respond to a 3 days course of antibiotics and it is therefore not felt to be cost-effective to send MSUs in every case. This does lead to diagnostic and management difficulties if the patient goes on to develop pyelonephritis.

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## CASE-BASED DISCUSSION – TESTICULAR TORSION

Amr Hawary & Ian Pearce

### Case-Based Discussion - Testicular Torsion. Patient Management.

#### Abstract

This Case-Based discussion focuses on the case of a 17 year old student presenting in the early hours of the morning to the emergency department with acute left hemi-scrotal pain and discusses the evaluation and management of his condition.

#### Case History

A 17 year old student was woken-up from sleep by severe left testicular and lower abdominal pain. He had multiple episodes of vomiting in the car on the way to the hospital. He is accompanied by his parents.

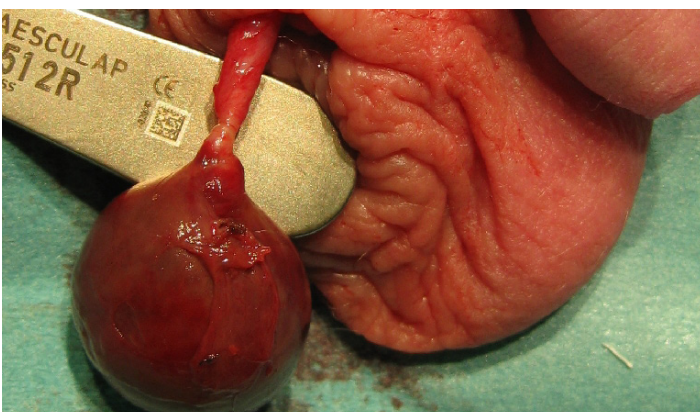
#### 1. How would you assess this patient?

A concise, focused history should be taken from the patient while ensuring adequate analgesia is given.

#### History of Presenting Complaint

- 1. When did the pain start?**
- 2. How bad is the pain on a scale of 1-10?**
- 3. Any previous history of similar pains?**
- 4. Any urinary complaints e.g., dysuria, frequency, urgency?**
- 5. History of urethral discharge.**
- 6. History of recent trauma to the abdomen or testicles?**

The patient described excruciating pain localized to the left testicle which woke him up from sleep and denied any history of trauma or urinary complaints. He described several previous similar episodes of pain of less severity which were short lived and resolved spontaneously suggesting possible intermittent testicular torsion.



#### Systems Review

There are certain points in the history which must be considered when attempting to either confirm or refute a differential diagnosis.

- 1. History of back ache**
- 2. History of weight loss**
- 3. History of haemoptysis**

All of these, if positive, suggest possible testicular malignancy and should be asked of all patients presenting with acute scrotal pain.

#### Examination

- The diagnosis of testicular torsion is primarily a clinical one. On inspection, the testicle was clearly swollen and elevated with an apparent transverse lie.
- Palpation was impossible, as is usually the case, due to severe pain.
- The patient is apyrexial and examination of the contralateral testis reveals this to have a horizontal lie, known as "Bell Clapper" testis (see Figure 1).

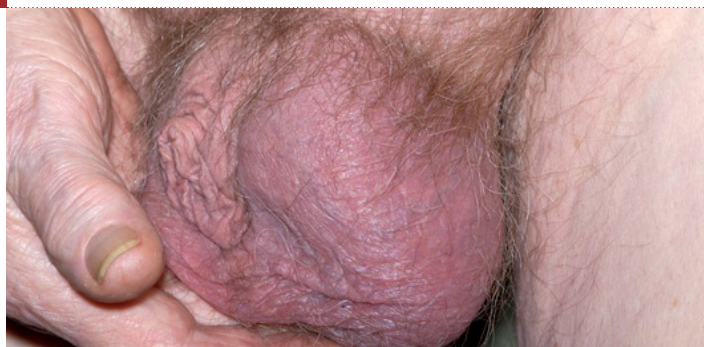
#### Investigations

Bedside dipstick urinalysis should be performed. In the case of testicular torsion, urinalysis should be negative although microscopic haematuria may be present. The presence of nitrites, proteins or leukocytes implies urinary tract infection. In such cases a formal MSSU should be sent

The role of "Doppler Ultrasonography" is dictated by the available time frame. If easily obtained without delay, USS will be able to illustrate the presence or absence of adequate blood flow into the testis. In the case of testicular torsion, blood flow will be absent and typically with infection, blood flow will be increased. If obtaining USS will cause a delay in patient management, it should be avoided.

## CASE-BASED DISCUSSION – TESTICULAR TORSION

Amr Hawary & Ian Pearce



### Case-Based Discussion - Testicular Torsion. Patient Management.

#### 2. What is the differential diagnosis?

There are many differential diagnoses of acute scrotal pain (see Table 1)

<b>Testicular torsion</b>
<b>Epididymo-orchitis</b>
<b>Torsion of testicular appendage (hydatid of Morgagni),</b>
<b>Acute traumatic haematocele</b>
<b>Haemorrhage into a testicular tumour</b>

**Table 1 : Differential Diagnoses for Acute Scrotal Pain.**

##### 1. Testicular Torsion

##### 2. Epididymo-orchitis

Patients usually give a history of few days of dysuria, pain is usually less severe and there are local signs of erythematous scrotal skin, testicular swelling and hotness together with systemic manifestations of infection. In young men it may be due to sexually transmitted disease and the patient may give a history of recent unprotected intercourse.

##### 3. Torsion of Testicular Appendage (Hydatid of Morgagni)

This is the most common cause of acute hemi-scrotal pain in boys prior to puberty and presents in exactly the same way as testicular torsion. In certain cases a visible dark spot towards the upper pole of the testis may be visible through the stretched scrotal skin: the blue dot sign ( see Figure 2). If adequate pain relief is obtained, intervention is not required but surgical exploration with a view to diathermy excision of the offending appendage will both effect pain resolution and hasten recovery

##### 4. Acute Haematocele

There is usually a history of recent scrotal trauma, causing a secondary hydrocoele or haematocele (with blood loss). It may be impossible to distinguish this from testicular torsion without surgical exploration but usually the swelling is more obvious and of a more rapid onset.

##### 5. Testis Tumour

15% of testicular tumours present acutely secondary to acute haemorrhage into the tumour. A history of trauma is not always evident but the patient may give a history of other symptoms suggestive of malignancy e.g., weight loss, haemoptysis, backache.

#### 3. How will you manage this patient?

Once a diagnosis has been made or is suspected there is no time to be lost in obtaining routine investigations. The extent and duration of torsion prominently influence both the immediate salvage rate and late testicular atrophy. Testicular salvage most likely occurs if the duration of torsion is less than 6-8 hours. If 24 hours or more elapse, testicular necrosis develops in most patients. Nevertheless, testicular exploration should be performed regardless of the duration of pain.

#### Management

Immediate surgical exploration is the only treatment for testicular torsion. If torsion is confirmed and the testis is viable following de-rotation, bilateral orchidopexy with non-absorbable sutures should be performed. If the testis is not viable orchidectomy is performed with contralateral orchidopexy and if no torsion is discovered, the scrotum should be closed without further intervention. Some centre(s) advocate orchidopexy in the event of negative exploration but there is no evidence to suggest this should be performed in the absence of testicular torsion. When orchidopexy is performed, non-absorbable suture should be utilized adopting a three point fixation technique to avoid further torsion about an axis created by only two fixation points.

#### 4. How will you counsel this patient pre-operatively?

##### Counseling

The patient should be counseled that failure to correct testicular torsion will result in testicular atrophy and loss and that if the testis is not viable following de-rotation, orchidectomy will be performed. He should therefore consent to both bilateral orchidopexy orchidectomy, if required.

Whilst unilateral orchidectomy reduces fertility, this reduction is usually compensated by the fertility of the female partner and as such is normally clinically insignificant

## CASE-BASED DISCUSSION – TESTICULAR TORSION

Amr Hawary & Ian Pearce

### Discussion

Testicular torsion is a true urological emergency requiring immediate surgical intervention to prevent testicular loss. This is a painful condition caused by the twisting of the spermatic cord, which causes venous oedema and subsequent arterial insufficiency resulting in ischaemia, testicular necrosis and atrophy. Torsion is the most common cause of testicle loss in adolescent males. It usually occurs around puberty although it has been described in all age groups from infants to adult life.

Testicular Torsion can be predisposed by testicular trauma but a history of trauma is often absent. An abnormally long mesorchium resulting in a so called “Bell Clapper” deformity predisposes to testicular torsion and occurs bilaterally. Testicular torsion has also been reported to occur more frequently during physical activity and bouts of cold weather, as a result of cremasteric contraction.

#### Two types of testicular torsion have been described as:

- Extravaginal testicular torsion in which the testis and its coverings twist in their entirety within the scrotum. Testicular torsion in neonates and intrauterine life is of this type.
- Intravaginal testicular torsion in which the testis twists within the confines of the tunica vaginalis. This type of testicular torsion usually occurs in adolescents

### Self Assessment Best of Five

#### 1. All of the following can predispose to testicular torsion except:

- a. Trauma
- b. Bell clapper deformity
- c. Severe UTI
- d. Physical activity
- e. Cold weather

#### 2. What is the age group, where testicular torsion should not be included in the differential diagnosis when examining an acutely painful testicle:

- a. Neonate
- b. 10 – 20 years old
- c. 20 – 30 years old
- d. Over 60 years old
- e. It should be considered in all age groups.

#### 3. If unsure of the diagnosis, the best action is:

- a. Arrange for urgent scrotal ultrasound scan.
- b. Opioid analgesics and examine in 2 hours.
- c. Immediate scrotal exploration.
- d. Urgent blood and urine tests.
- e. Admit for analgesia and antibiotic treatment and arrange for scrotal exploration next morning.



#### 4. Patients with testicular torsion can present with:

- a. Fever
- b. Nausea and vomiting
- c. Severe inguinal pain
- d. Dysuria
- e. All of the above

#### 5. With history of pain for more than 24 hours:

- a. Immediate surgical exploration.
- b. Explore on the next available list.
- c. Conservative treatment.
- d. Highly unlikely to be testicular torsion.
- e. None of the above.

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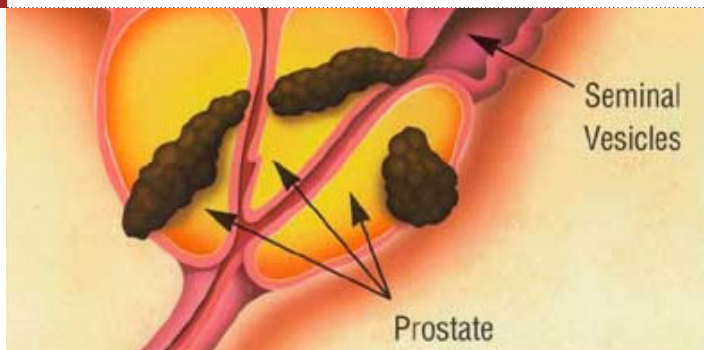
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## CASE-BASED DISCUSSION – PROSTATE CANCER SCREENING AND DIAGNOSIS

Hazel Warburton and Neil Rothwell



### Case-Based Discussion – Prostate Cancer Screening & Diagnosis. Patient Management.

#### Abstract

This discussion is based on the diagnostic pathway of a 55 years old man with a family history of prostate cancer. As well as explaining the assessment and process of investigation it also addresses the controversies of screening patients for prostate cancer.

#### Case History

A 55 years old man has been referred from his GP because his brother has recently been diagnosed with prostate cancer and he has requested screening for prostate cancer. His GP has performed a PSA and it has returned at a level of 3.5, but he has not been reassured and wishes he could see Urologist.

#### Which men in the UK should consider being screened for prostate cancer? What is his risk of prostate cancer?

Prostate cancer is the most common malignancy diagnosed in men (more than lung or colon)<sup>1</sup> and is the second leading cause of cancer death in men<sup>2</sup>. Prostate cancer screening. Current national policy is only to support population screening within clinical trials. Most urological societies do not recommend widespread screening of men. This is because despite many trials, including two recent extensive screening trials in Europe<sup>3</sup> and the United States<sup>4</sup>, no clear evidence of benefit over harm has been demonstrated. In these two prospective population-based screening programmes involving tens of thousands of men the general conclusions were that screening lead to an over diagnosis of prostate cancer with little or no change in the overall mortality from the disease. In Europe PSA screening is opportunistic, that is offered to men with symptoms, a family history or on request providing they have received counselling on the consequences of a high measurement.

The lifetime risk of a man to be diagnosed with prostate cancer as a result of symptoms or screening is about 1 in 12<sup>5</sup>. It is estimated that 3% of all male deaths are due to prostate cancer<sup>5</sup>. Our case does have a 2-4 fold increase risk of prostate cancer as his older brother also has the disease<sup>6</sup> (see Table 1).

Family History	Relative Risk	Absolute Risk(%)
None	1	8
Father or brother	2	15
Father or brother <60 years	3	20
Father and brother	4	30
Hereditary prostate cancer	5	35-45

**Table 1: Family history and associated risk of prostate cancer<sup>7</sup>**

#### A detailed history is taken from the patient.

The incidence and mortality of prostate cancer is highest in Black African/ Caribbean men and lowest in men of Chinese ethnicity. Before taking the history, it is important to take account of this.

#### 1. Presenting Symptoms

- Localised prostate cancer rarely causes any symptoms but when present are aides to diagnosis and are important when deciding on treatment options.
- An assessment of lower urinary tract symptoms should be undertaken;
  - How many times does he go to the toilet in the day/ night?
  - Does he have to wait or strain to void? (hesitancy)
  - Does he ever have to rush to the toilet? (urgency)
  - Is his flow weak?
  - Does he empty his bladder completely?
- I-PSS (International Prostate Symptom Score) is a routinely used validated patient questionnaire which quantifies the severity of symptoms.
- Does he or she has ever suffered from cystitis/prostatitis/epididymitis? (causes of a falsely high PSA)
- Has he ever experienced frank haematuria?
- Has he any new symptoms of bone pain which might indicate metastatic disease?

## CASE-BASED DISCUSSION – PROSTATE CANCER SCREENING AND DIAGNOSIS

Hazel Warburton and Neil Rothwell

### 2. Past Medical History

- UTI (Urinary Tract Infection).
- TURP/prostate or urethral surgery.
- Abdominal/Pelvic surgery.
- Pelvic radiotherapy.
- Significant co-morbidities.

### 3. Drug History

- Anticoagulants/ anti platelet agents.
- 5 alpha reductase inhibitors (5- $\alpha$ RI).

### What are 5- $\alpha$ RI? Can you name them? And how do they affect PSA?

The enzyme 5-alpha-reductase in prostate cells facilitates the conversion of testosterone into dihydrotestosterone (DHT). DHT is the biochemically active androgen in the prostate. Inhibition of DHT leads to atrophy of the prostate, thus a decrease in prostate size and consequently a reduction in PSA. The two commercially available are Dutasteride (Avodart®) and Finasteride (Proscar®). After six months of 5- $\alpha$ RI therapy a man's PSA level is approximately halved.

### 4. Family History

- The relationship and age of affected family members.
- Any information on the stage at which they presented treatment they received or death from the disease.

### 5. Sexual History

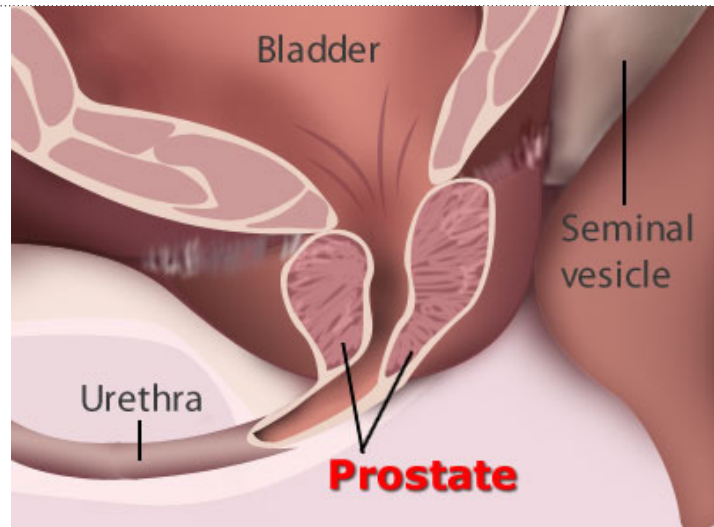
- Does he have normal erections?
- Does he want any further children?

He has little in the way of bothersome lower urinary tract symptoms (his I-PSS is 2/35). He has no symptoms of UTI. He is fit and well. He is in a long-term relationship with normal sexual function.

His brother was diagnosed age 59 with early disease and he underwent a radical prostatectomy. He has a younger brother who has not been tested for prostate cancer, he has an uncle who died of prostate cancer age 69 and his father is alive aged 88 with no known prostate cancer.

### What are the most important points in the examination of this gentleman?

- Digital Rectal Examination (DRE).
- Urinalysis.



### How do you perform a DRE? What are the possible findings of DRE and how reliable are they?

Explain to the patient that you need to examine their prostate to check for the presence of a palpable tumour. This involves placing a gloved finger into their rectum. Ideally a chaperone is present. Usually the patient is placed in left lateral with the hips flexed to 90 degrees or more. The anus is then inspected to ensure there are no fissures or fistula by raising the right buttock. The gloved and lubricated right index finger is normally used. The pulp of the finger generally pushes from anterior to posterior overcoming the tone of the sphincter. The hand is then rotated anteriorly to examine the prostate. The consistency (soft/firm), size (walnut is normal size and roughly equates to 25g and the gland increases in size with age), the presence/absence of the normal bilobar configuration with midline sulcus and the size and site of any lumps or nodules. DRE can be a poor tool in diagnosing prostate cancer, for example ~50% of abnormal DRE's are not caused by prostate cancer (BPH, prostatic calculi, infection etc). It is noteworthy that around 18% of prostate cancer is diagnosed by an abnormal DRE when the PSA is normal, so it remains a vital examination.

This gentleman's urine dipstick is NAD, rectal examination reveals a soft 40g gland, and his PSA is 3.5

### What is PSA? What causes a high PSA? What is a 'normal' PSA?

PSA (Prostate Specific Antigen) is an enzyme (serine protease) which functions to liquefy semen without which fertilisation could not occur. It is only expressed by prostate epithelia. In health PSA levels in the circulation are low, when prostate epithelial cells are increased or their architecture destabilised by disease leakage of PSA into the circulation increases (see Table 2). Table 3 shows a widely accepted age specific normal range for PSA<sup>8</sup>. An individual's PSA may naturally be high in health, and about three quarters of men with a high level do not have cancer<sup>9</sup>. Conversely there is an incidence of prostate cancer in those with low PSA's (see Table 4)<sup>10</sup>. Many urologists look at the PSA dynamics from serial readings, but an elevated age specific PSA is a strong indication for prostate biopsy.

## CASE-BASED DISCUSSION – PROSTATE CANCER SCREENING AND DIAGNOSIS

Hazel Warburton and Neil Rothwell



### Case-Based Discussion – Prostate Cancer Screening & Diagnosis. Patient Management.

Causes of an Elevated PSA
§Prostate Cancer
Age
BPH
UTI
∂Prostatitis
Retention
Catheterisation
Cystoscopy
Prostate biopsy
¥Immediately post surgery
βPost Radiotherapy
Potential causes an Elevated PSA
Cycling
Prostate massage
No elevation in PSA
DRE

- § Increases with advancing disease, but may not be elevated in poorly differentiated tumours.
- ∂ Modest rise with chronic disease but in acute disease levels commonly exceed 20
- ¥ Quickly decreases, post radical prostatectomy should be unrecordably low by 6 weeks
- β It can take 2 years for the PSA to reach nadir (its lowest level)

Age Range	Normal PSA Range (ng/ml)
All ages	<4.0
40–49	<2.5
50–59	<3.5
60–69	<4.5
>70	<6.5

Table 3: The age-adjusted normal range for PSA<sup>8</sup>

PSA ng/ml	Risk for Prostate Cancer %
0.0–0.5	6.6
0.6–1.0	10.1
1.1–2.0	17.0
2.1–3.0	23.9
3.1–4.0	26.9

Table 4: Risk of prostate cancer in men over 55 with a PSA <4ng/ml<sup>9</sup>

You recommend a prostate biopsy, how would you explain this to the patient?

This gentleman's PSA is at the upper limit of the age-specific range. He has a strong family history of prostate cancer. His choice lies between biopsy now and a period of clinical and PSA surveillance.

He chooses to undergo prostate biopsy

Prostate biopsy is performed under local anaesthetic. In the same position as the rectal examination an ultrasound probe is insertion into the rectum. The USS allows the examiner to scan the prostate for abnormalities and measure the prostate. Local anaesthetic is injected around the prostate gland so that needle biopsies can be performed. Usually 10-12 biopsies are taken. Antibiotics are given before the biopsy and sometimes for a short while afterwards. Commonly in the UK 750-1000mg Ciprofloxacin is given one hour before the procedure or 500mg before followed by 500mg bd for 3 days. Other than the discomfort of the procedure the side effects include the passage of blood in the urine, in the semen and on defecation (50%), UTI (5%), serious urosepsis (1%), and retention (1%). The chance of a false negative result is 10–20% thus, a normal biopsy, while reassuring, does mean a period of close observation is required.

The results of the prostate biopsy unfortunately confirm prostate cancer. They demonstrate Gleason 3 + 3 = 6 adenocarcinoma of the prostate involving 50% of cores from the left lobe and the right sided cores are negative.

## CASE-BASED DISCUSSION – PROSTATE CANCER SCREENING AND DIAGNOSIS

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### Can you explain the results of the biopsy?

The Gleason score is the grade given to the microscopic glandular appearance of prostatic adenocarcinoma. Glands are graded 1-5. The first number corresponds to the most frequent pattern and the second the next most commonly seen. Gleason grade <6 are well, 7 intermediate, and 8+ poorly differentiated. Increasing Gleason scores closely correlate with prognosis. The disease was only found on the left side of the gland but a high percentage of the sample is involved, a factor which tends to support early treatment.

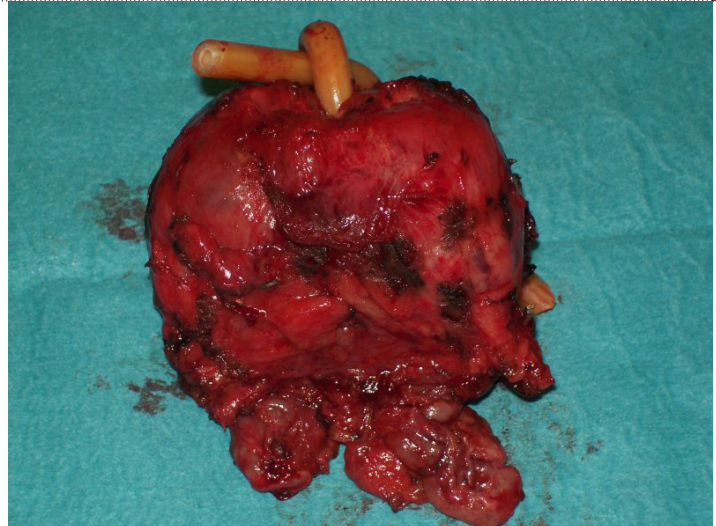
This gentleman's case was discussed at the cancer MDT meeting. No further imaging or investigation was required. His treatment options include active surveillance, radical prostatectomy (open, laparoscopic or robotic), radiotherapy or brachytherapy. Other treatment options are available e.g., High intensity focused ultrasound and cryotherapy but only in the context of controlled clinical trials comparing their use with established interventions<sup>5</sup>.

### Discussion

Prostate cancer screening and diagnosis remain a significant challenge. While prostate cancer is a significant disease both in term of prevalence and mortality, most men with prostate cancer are never destined to die from their disease. It is though noteworthy to know that in the UK 10,170 died of prostate cancer in 2008<sup>12</sup>. Ninety three percent of prostate cancer deaths occur in the over 65's.

The most acceptable test used in prostate cancer screening is PSA but as shown above this lacks specificity and sensitivity thus an 'abnormal' reading can lead to significant harm to an individual (stress/anxiety, exposure to the risks of biopsy [fatalities have occurred], potential for over treatment and its ill effects). Not enough is yet known about the natural history of prostate cancer. When it is diagnosed we cannot reliably predict which men have clinically significant disease. Furthermore there is no agreement on what is the best treatment for screen diagnosed localised prostate cancer.

Radical treatment of early low and intermediate risk localised disease in fit patients confers excellent cure rate and very low risk of death from the disease. Radical treatment can result in significant morbidity including risks to a man's continence and potency. Most surgeons offer radical prostatectomy to individuals with a life expectancy of greater than 10 years and rarely to the over 70s. This is because of a randomised trial comparing radical prostatectomy and watchful waiting in men with localised, well to moderately differentiated prostate cancer. The overall mortality from any cause, within 10 years of follow-up, comparing prostatectomy to watchful waiting was 27.0% vs. 32.0% respectively<sup>13</sup>. No RCT exists comparing radical radiotherapy (the most commonly employed treatment) to watchful waiting.



### Conclusion

Our gentleman is best served when we help him make an informed decision about treatment options individualised to his circumstances. The information needed include his PSA and rectal examination findings, his age and co morbidities along with his risk factors and any previous PSA results or prostate biopsies.

### Questions

**1. Which of the following is unlikely to be the cause of a 70 years old gentleman who is found to have a PSA of 12?**

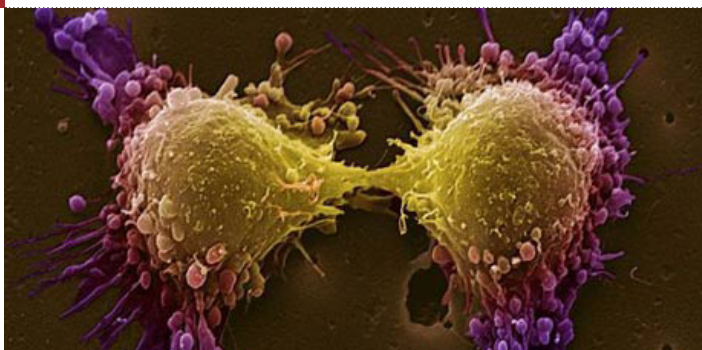
- A. An active UTI
- B. His finasteride treatment
- C. A 100g prostate
- D. Prostate cancer
- E. Post micturition bladder volume of 450ml

**2. With regard to PSA which of the following is true?**

- A. More PSA is produced by cancer cells than benign
- B. Normal PSA levels in health fluctuate by 5ng/ml
- C. PSA levels are commonly lower in Black men compared to white
- D. Rectal examination does not increase PSA
- E. PSA is an enzyme important in semen liquefaction

## CASE-BASED DISCUSSION – PROSTATE CANCER SCREENING AND DIAGNOSIS

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### Case-Based Discussion – Prostate Cancer Screening & Diagnosis. Patient Management.

#### Answers

##### 1. B.

A PSA of 12 in a 70 year old man is above twice the upper limit of normal for his age. Finasteride would be expected to decrease his PSA. Enlargement of the prostate and chronic retention have both been shown to significantly increase PSA. Infection and cancer are the two most important disease states that lead to an increase in the PSA.

##### 2. E.

Less PSA is made by malignant cells, but is measured at higher levels in the blood because more leeches into the blood stream, in health the normal PSA fluctuates by 1ng/ml. PSA is more commonly normally higher in Black men. Rectal examination does not increase PSA. PSAs role is in the liquefaction of semen.

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## CASE-BASED DISCUSSION – URINARY RETENTION

Sailaja Pisipati and Ian Pearce

### Case-Based Discussion – Urinary Retention. Good Clinical Care.

#### Case History

A 72 years old male is referred by the GP to the surgical assessment unit with dribbling of urine, nocturnal incontinence, suprapubic swelling and renal failure.

#### What aspects are important in this man's history?

##### Presenting Complaint

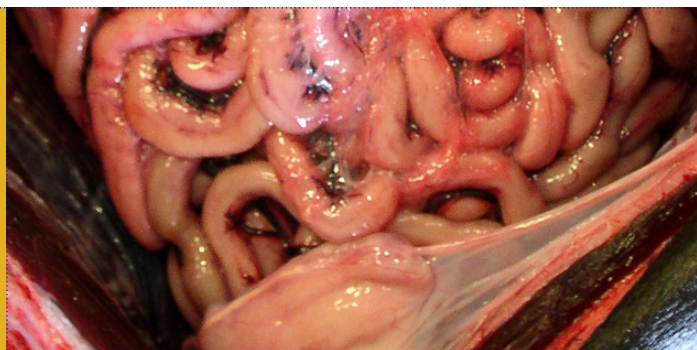
- Is the patient able to pass urine or is he in acute retention?
- Is the incontinence both day and night or nocturnal only?
- Is there associated suprapubic pain or discomfort, suggestive of infection?
- Can the patient feel suprapubic fullness or have a feeling of incomplete bladder emptying?
- Are there any associated urinary symptoms such as frequency, urgency, poor flow or a sensation of incomplete emptying?
- Does the patient have a history of recurrent urinary tract infections?
- Is there associated shortness of breath, pedal oedema, weight gain suggesting fluid overload?

##### Past Medical History

- Any past history of prostatic problems?
- Renal failure/chronic kidney disease?
- Previous prostatic surgery?
- History of diabetes, parkinson's or any other neurological diseases?

##### Drug History

- Is he on  $\alpha$ -blockers, 5-alpha reductase inhibitors, anti-psychotics, anti-depressants, or any other medication which may affect the function of his lower urinary tract?
- Is he on anti-coagulants? (This information is helpful whilst planning definitive future management.)



Urinary retention is the inability to void or the inability to empty the bladder to completion<sup>1</sup>. It can be classified as acute or chronic, painful or painless. Chronic urinary retention can be of high pressure or low pressure (see Table 1)<sup>2</sup>.

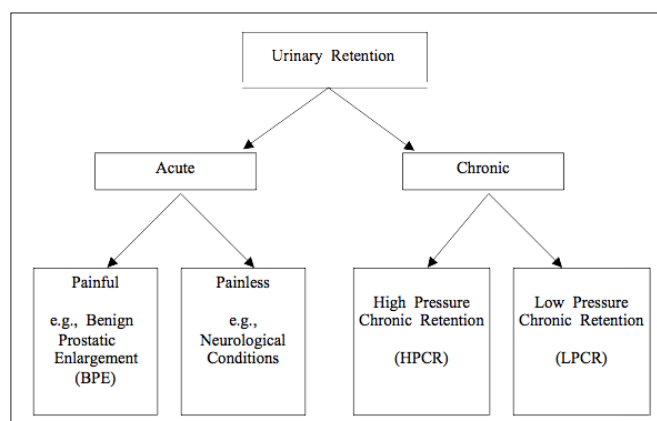


Table 1: Classification of urinary retention.

It becomes clear that this man has a background history of urinary frequency, nocturia and poor urinary flow. His history spans a few years and he has noticed weight gain and increased abdominal girth. There are no signs of infection and he does not give a history of constipation.

#### What might you find on examination?

It is essential to elicit information regarding the general condition of the patient, co-morbidities, and current medication. This should be followed by a general examination that should include temperature and vital parameters; and specific abdominal examination, the positive findings of which are listed in Table 2<sup>2</sup>.

- Inspection** - Infraumbilical abdominal distension.
- Palpation** - Suprapubic, non pulsatile mass arising from the pelvis.
- Percussion** - Dull and uncomfortable/tender.

Table 2: Abdominal findings in urinary retention.

## CASE-BASED DISCUSSION – URINARY RETENTION

Sailaja Pisipati and Ian Pearce

### Case-Based Discussion – Urinary Retention. Good Clinical Care.



#### What investigations would you perform?

- **Full Blood Count (FBC)**
- **Urea & Electrolytes (U&E's)**
- **Blood glucose**
- **Urine analysis/dipstick**
- **Post-micturition residual volume estimation**

Do not perform Prostate Specific Antigen (PSA) at this stage (unless specifically requested by a urologist) as this will be falsely elevated.

Your investigations reveal that this patient has a residual volume in excess of 2l with impaired renal function indicating high pressure chronic retention.

#### What is the aetiology of chronic urinary retention?

##### **Obstructive**

Mechanical obstruction (e.g., Benign prostatic hyperplasia, urethral stricture, urethral stone).

##### **Dynamic obstruction**

(i.e., increase in smooth muscle tone; e.g., Post-operative pain, drugs).

##### **Neurological**

Interruption of sensory or motor innervations to the bladder (e.g., Pelvic surgery, multiple sclerosis, spinal injury, diabetes).

##### **Myogenic**

Over-distension of the bladder (e.g., Post-anaesthesia, high alcohol intake).

**Table 3: Causes of urinary retention<sup>3</sup>.**

The aetiology of chronic urinary retention (CUR) is complex and can be divided into high pressure chronic retention (HPCR) and low pressure chronic retention (LPCR)<sup>4, 5, 6</sup>. The terms high and low refer to the detrusor (muscle of the bladder wall is known as detrusor) pressure at the end of micturition (i.e., at the beginning of the next filling phase)<sup>5, 6</sup>. Bladder outlet obstruction usually exists in HPCR, and the voiding detrusor pressure is high but is associated with poor urinary flow rates. The constantly raised bladder pressure in HPCR during both the storage and voiding phases of micturition creates a backward pressure on the upper-tract drainage and results in bilateral hydronephrosis. Other patients may have large-volume retention in a very compliant bladder with no hydronephrosis or renal failure, and they are said to have LPCR. Urodynamic studies in these patients show low detrusor pressures, low flow rates, and very large residual volumes. Lower urinary tract symptoms (LUTS), however, are usually mild in CUR, certainly in the early stages, until the onset of nocturnal enuresis, which results from the drop in urethral resistance during sleep. In nocturnal enuresis, urethral resistance is overcome by the maintained high bladder pressure, which causes incontinence (sometimes inappropriately called overflow incontinence).

- Give antibiotics, if symptoms and signs of infection.
- Do not use a female length catheter in a male urethra.
- Document the size of the catheter used and the amount of water instilled into the balloon.
- Document the residual volume.
- Replace the prepuce onto the glands penis at the end of procedure.
- Check, if catheterisation has relieved the pain.
- Always perform a digital rectal examination (DRE) after the residual volume is drained.
- Ensure palpable mass resolved.
- Always send urine sample for microscopy, culture & sensitivity.
- Leave the catheter on continuous free drainage without clamping.

**Table 4: Important points to remember on catheterisation.**

## CASE-BASED DISCUSSION – URINARY RETENTION

Sailaja Pisipati and Ian Pearce

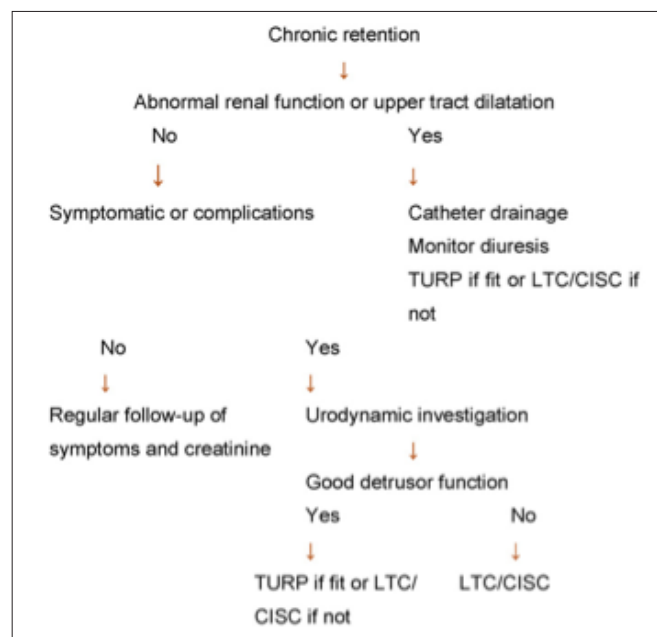
This patient was noted to have deranged U&Es. What radiological imaging would you consider to investigate this patient?

Renal ultrasound performed in the acute phase in patients with HPCR may demonstrate bilateral hydronephroureterosis associated with a distended bladder. Hydronephrosis usually resolves in a few weeks following decompression of the bladder with catheterisation. The role of renal ultrasound in patients with acute deranged renal function secondary to bladder outflow obstruction in the initial stages is controversial. It is increasingly being reserved for patients whose renal function fails to improve following catheterisation.

How would you manage a patient in chronic retention?  
When is early catheterisation indicated?  
What crucial points might be noted to confirm a diagnosis of HPCR?

Catheterisation is less urgent because the condition is generally less painful or painless compared to acute urinary retention. Early catheterisation is indicated if renal dysfunction or upper tract dilatation is present, or when a patient presents with painful, acute retention on a background of chronic retention. Patients must be monitored for post-obstructive diuresis and may pass many litres of urine in the first few days following catheterisation. This diuresis results from offloading retained salt and water (retained in the weeks prior to the episode of retention), loss of the cortico-medullary concentration gradient caused by reduced urinary flow through the chronically obstructed kidney, or a high urea level that results in osmotic diuresis. This may in turn, manifest as dizziness due to postural hypotension (symptomatic drop in systolic blood pressure by greater than 20mm Hg from lying to standing position); hence it is important to monitor lying and standing blood pressure.

In about 10% of cases, diuresis is excessive and requires careful fluid replacement. Daily weighing is the most accurate way of monitoring fluid output. After the first 24 hrs, fluid replacement should not strictly follow output; this would perpetuate the diuresis. Potassium levels, which are often high, should be monitored and will usually (but not always) fall with the diuresis. Catheterisation is often followed by haematuria; this is caused by renal tract decompression and not usually by the catheter itself. The practice of slow decompression is unnecessary, and any haematuria usually settles after 48–72 hrs. If there is evidence of renal failure, which settles with catheterisation, the patient should not undergo a trial without catheter (TWOC)<sup>3</sup>.



**Table 5: Management of chronic urinary retention<sup>3</sup>.**

CISC = clean intermittent self-catheterisation.

LTC = long term catheter.

TURP = transurethral resection of the prostate.

What are the definitive treatment options in patients with HPCR?

**Patients with HPCR should be offered either:**

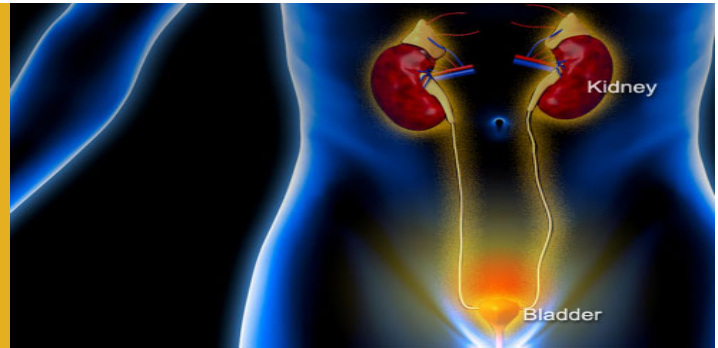
- 1) transurethral resection of prostate (TURP), if fit or
- 2) Long Term Catheter (LTC) in those who are at a high-risk for complications with surgical intervention.

Patients with LPCR do poorly after TURP, frequently failing to void completely after surgery, even after prolonged periods of catheterisation; this is probably due to detrusor changes over time<sup>4,7</sup>. Clean Intermittent Self Catheterisation (CISC) should be considered in this group<sup>4</sup>.

## CASE-BASED DISCUSSION – URINARY RETENTION

Sailaja Pisipati and Ian Pearce

### Case-Based Discussion – Urinary Retention. Good Clinical Care.



Key points to remember in patients with HPCR

- Background of chronic retention.
- May present with acute on chronic retention.
- Suprapubic fullness (palpable bladder) - painful or painless.
- Nocturnal enuresis.
- Impaired renal function +/- hyperkalemia
- Indications for catheterisation include impaired renal function, bilateral hydronephrosis on renal ultrasound, acute painful retention on a background of chronic retention
- Parameters to note following catheterisation include post-obstructive diuresis, decompression haematuria, daily weight chart, lying and standing blood pressure
- Definitive treatment options include transurethral resection of prostate or a long term catheter

### Self-Assessment Questions

1. A 78 years old gentleman is referred to the out-patients department with frequency and dribbling. On examination he is in painless chronic retention. Digital rectal examination reveals a smooth, enlarged prostate. Which biochemical investigation would you perform at this stage?

- A: Urea and Electrolytes (U&Es)
- B: Prostate Specific Antigen (PSA)
- C: Bone profile
- D: Liver function tests
- E: Renal ultrasound scan

2. How would you manage the above patient if his GP stated in the referral letter that his creatinine is  $450\mu\text{mol/l}$ , potassium is  $5.8\text{mmol/l}$  and a renal ultrasound scan demonstrated bilateral hydronephrosis.

- A: Catheterise the patient and send home.
- B: Catheterise the patient and admit.
- C: Send home and organise admission for Trans-urethral Resection of Prostate (TURP) in a few months.
- D: Arrange for tuition of Clean Intermittent Self-catheterisation (CISC).

3. Which of the following parameters would you monitor whilst managing an in-patient with high pressure chronic retention (HPCR)?

- A: Daily weights
- B: Daily U&Es
- C: Lying and standing blood pressure
- D: Daily fluid balance
- E: All of the above

4. Which of these is not a definitive treatment option in patients with HPCR?

- A: Long term urethral catheter
- B: Long term suprapubic catheter
- C: Clean intermittent self catheterisation
- D: Transurethral resection of prostate

### Answers

#### Question 1

a. It is prudent to check the patient's renal function and electrolytes as he could have HPCR. Patients with HPCR have impaired renal function and hyperkalemia. PSA, serum calcium and alkaline phosphatase are only performed in cases of suspected prostatic adenocarcinoma with possible bony metastases. Renal ultrasound is a radiological investigation performed to determine if there is associated hydronephrosis.

## CASE-BASED DISCUSSION – URINARY RETENTION

Sailaja Pisipati and Ian Pearce

### Question 2

b. Patients who are not in painful retention, but have abnormal renal function and bilateral hydronephrosis (secondary to obstructive uropathy) should be catheterised immediately. They must be monitored for post-obstructive diuresis and may pass many litres of urine in the first few days following catheterisation, hence would require hospitalisation for careful monitoring of input-output balance and may require intravenous fluid administration. TURP is performed at a later stage after optimising the renal function. CISC is not a safe management option for patients with HPCR.

### Question 3

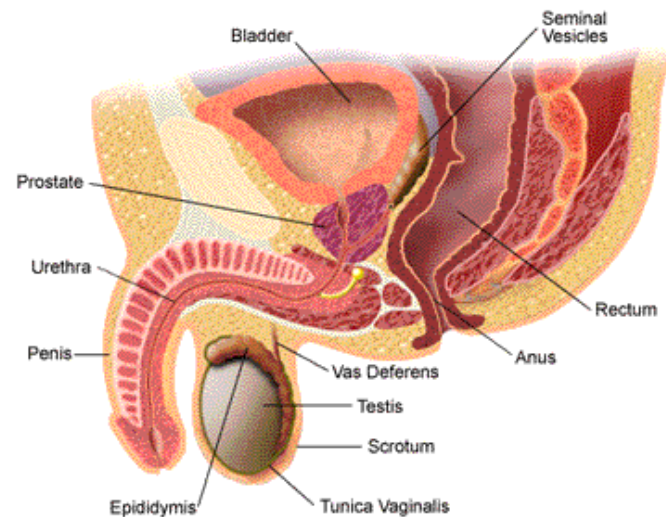
e. Patients with HPCR may pass many litres of urine in the first few days following catheterisation. The diuresis can result from offloading of retained salt and water (retained in the weeks prior to the episode of retention), and hence can result in weight loss and postural hypotension. Intravenous fluid administration might be required to counteract this. It is also vital to monitor the renal function to ensure that it returns to baseline. Patients with long-standing HPCR may develop a degree of chronic renal insufficiency secondary to obstructive uropathy.

### Question 4

c. LTC with either a urethral or a suprapubic catheter and TURP are the definitive treatment options for patients with HPCR. These tend to minimise the end-voiding detrusor pressures and hence prevent further deterioration in renal function, in addition to improving the flow. The end-voiding detrusor pressures tend to remain relatively high following CISC, thus affecting the kidneys. CISC is hence not considered to be a safe management option in patients with HPCR.

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## CASE-BASED DISCUSSION – RENAL COLIC

Kamran Syed, Thiru Gunendran



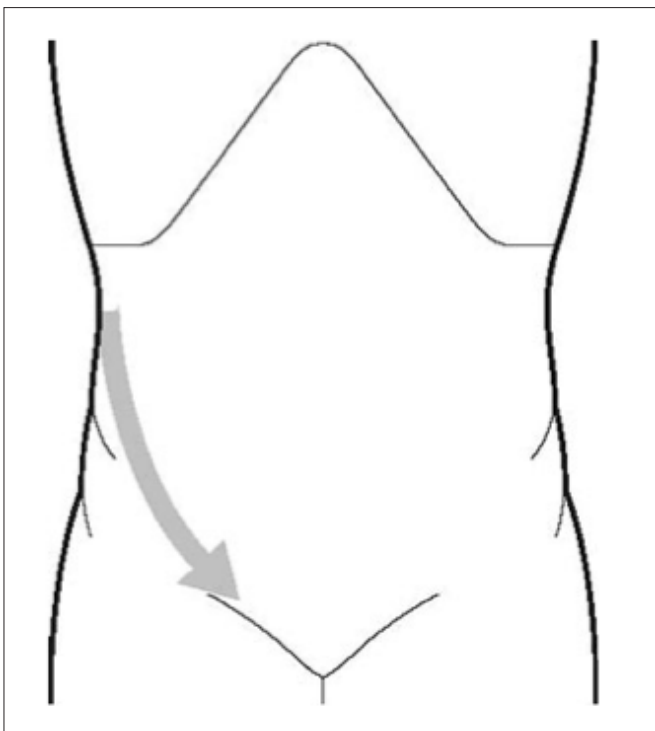
### Case-Based Discussion – Renal Colic. Patient Management.

#### Abstract

This Case-Based discussion focuses on a 54 year old male presenting with a history suggestive of renal colic. We will discuss general assessment, examination, investigation and management.

#### Case History

A 54 year old male presents to hospital with a 1 day history of sudden onset severe right loin to groin pain. The pain is spasmodic in nature with no similar previous episodes. The pain is partially relieved by a non steroidal anti-inflammatory drug (Voltarol 100mg). He denies any dysuria, haematuria, previous urinary tract infection or kidney stones.



#### History

A focused history from the patient is essential.

##### 1) Presenting problem:

*Ask for duration and nature of the pain?*

Renal or ureteric colic typically presents with sudden onset loin pain radiating to the groin. The pain is typically colicky.

*Any aggravating or relieving factors?*

Patients are often unable to get comfortable and may roll around in agony.

*Are there any systemic symptoms?*

e.g. nausea, vomiting, fever, rigors, dizziness?

*Any recent chest infection or cough?*

A lower lobe pneumonia can mimic renal colic.

*Any dysuria or visible haematuria?*

This could suggest an infection or a more sinister underlying cause.

*Any other lower urinary tract symptoms?*

Storage symptoms include urgency, frequency, incontinence and nocturia. Voiding symptoms consist primarily of hesitancy, poor flow, terminal dribbling and incomplete bladder emptying.

*Any testicular pain?*

Ureteric colic can present with testicular pain. Similarly testicular pathology can result in referred pain to the renal angle.

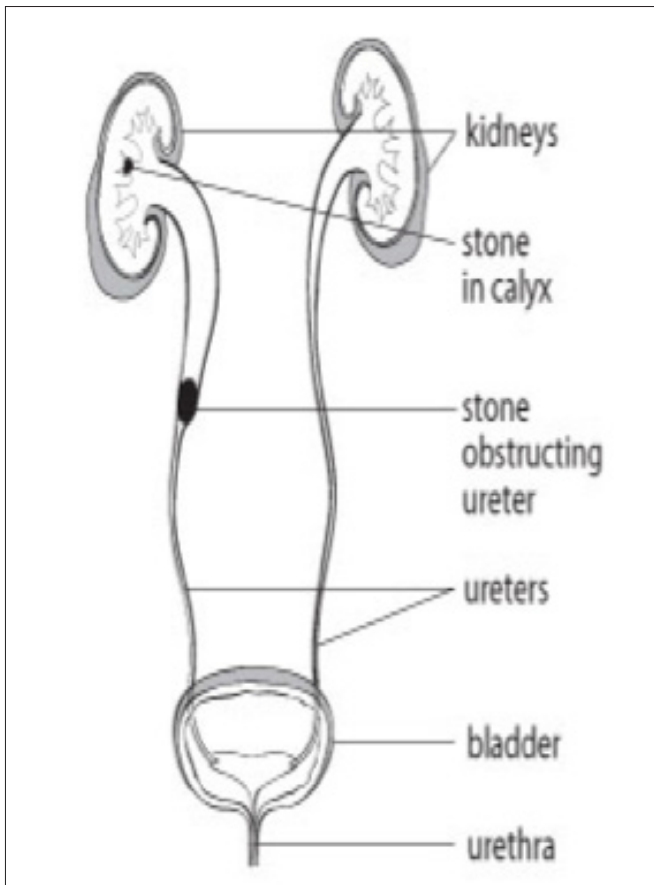
*Any recent change in bowel habit?*

Diverticulitis can mimic renal colic.

*Any history of recent trauma or strain?*

## CASE-BASED DISCUSSION – RENAL COLIC

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### 2) Past Medical History:

Ask specifically for any previous episode of renal colic. The lifetime risk of stones is 5% and previous stone formers have a 50% risk of forming another stone within the next 10 years.

Are there any significant general medical problems (e.g diabetes, chronic renal failure)? These medical factors may affect the way the stone is managed. Is there a history of Chrons disease? Such patients are at higher risk of oxalate stones.

Has the patient suffered from gout? This increases the risk of uric acid stones. 90% of stones are idiopathic whilst 10% may have an underlying cause such as hyperparathyroidism, vitamin D excess, or primary hyperoxaluria.

### 3) Drug History:

*Any drug allergies?*

Allergy to iodine contraindicates an intravenous urogram (IVU) due to the use of contrast.

*What medication is the patient on?*

There is a risk of lactic acidosis in patients on metformin if any contrast is administered whilst NSAIDs and ACE inhibitors are potentially nephrotoxic.

### 4) Social History:

Airline personnel and heavy goods vehicle drivers should be advised not to fly/drive if a stone is suspected. Diets high in oxalate (rhubarb, spinach, chocolate) may predispose to stone formation. Calcium oxalate stones are the commonest stones followed by calcium phosphate and mixed oxalate/phosphate stones (BOX 1).

#### STONE COMPOSITION

Calcium oxalate	0-75%
Calcium phosphate	10-15%
Mixed oxalate/phosphate	10%
Uric Acid	5-10%
Struvite (magnesium ammonium phosphate)	2-20%
Cystine	1%
Xanthine	rare
Indinavir stones	rare

(Indinavir is a protease inhibitor used in HIV treatment. These stones do not show up on X-Ray or CT)

#### Box 1:

#### What Would You Do Next?

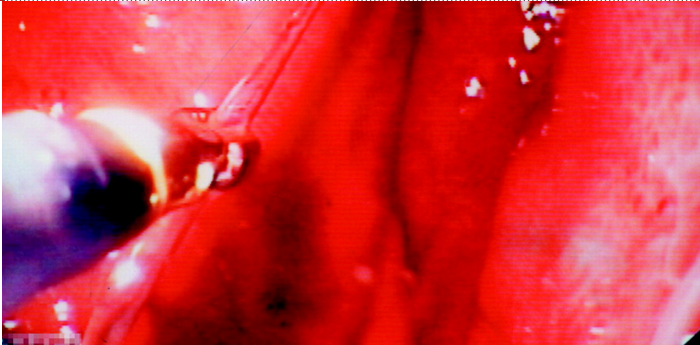
After taking a focused history, proceed to examine the patient looking in particular for worrying signs suggestive of sepsis or renal failure which would necessitate urgent intervention. Other differentials would be a ruptured or leaking abdominal aortic aneurysm (AAA) or other abdominal pathology.

#### General physical examination:

Look for general signs such as rigors or sweating that may indicate an associated infection. Cold, clammy patients are worrying as they may have a ruptured AAA (BOX 2).

## CASE-BASED DISCUSSION – RENAL COLIC

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### Case-Based Discussion – Renal Colic. Patient Management.

#### RED ALERT: EXCLUDE AAA

Features that may raise the suspicion of AAA include:

Palpable, pulsatile and expansile mass  
Hypotensive, cold, clammy patient  
Calcified and distended aorta on KUB

Risk factors for cardiovascular disease - smoker, hypercholesterolaemia, diabetes, hypertension

Stigmata of peripheral vascular disease - absent peripheral pulses, skin changes, history of claudication

#### Box 2

##### Cardiorespiratory examination:

Ensure no signs of upper or lower respiratory tract infection.

##### Abdominal examination:

Exclude an expansile, pulsatile mass suggestive of an aneurysm. If an aneurysm is suspected, urgent imaging must be arranged. Look for any loin mass, bruising or abscess which may indicate other causes for pain. Palpate for any rib or spine tenderness to suggest a muscular pain. Examine the external genitalia to exclude referred pain from testicular pathology.

#### Initial Management

**Resuscitation:** always ensure that the patient is clinically stable

##### Analgesics

First line – NSAIDs tend to be ideal for renal colic. They block the enzyme cyclooxygenase (COX) which results in inhibition of prostaglandin E2 and thromboxane. Prostaglandins cause dilatation of the glomerular afferent arteriole and by blocking this effect, NSAIDs result in decreased renal perfusion pressure. Second line – morphine, pethidine.

#### Initial Investigations

##### Blood tests:

Full blood count (FBC) and C-reactive protein (CRP) to look for signs of infection (BOX 3). Urea and electrolytes (U&E) to look for any renal impairment – mandatory if single functioning kidney. Abnormal liver function tests suggest biliary or liver pathology. Amylase to rule out pancreatitis. Calcium and urate to look for any predisposition to stone formation (basic metabolic study if stone is confirmed).

#### RED ALERT: Exclude an infected & obstructed system

Persistent pain and pyrexia with features of sepsis in patients with suspected stones need urgent imaging to rule out an infected, obstructed system.

If obstruction is present, urgent decompression by either a nephrostomy or stent would be necessary.

Urgent resuscitation with fluid, oxygen and antibiotics is essential. Arterial blood gas sampling would be beneficial to look for any acidosis. Some patients may require support in the high dependency unit.

#### Box 3

##### Urine dipstick:

Presence of blood is supportive of stones although other abdominal pathology such as appendicitis, diverticulitis and pelvic infections can also result in blood on dipstick.

##### Leucocytes and nitrites suggest an infection.

Significant proteinuria raises the possibility of glomerulonephritis or underlying renal disease.

##### Pregnancy test:

This must be undertaken in any women of child bearing age to exclude an ectopic pregnancy. It is also a requirement prior to any radiographic imaging (BOX 4).



## CASE-BASED DISCUSSION – RENAL COLIC

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**RED ALERT: Exclude an ectopic pregnancy**

All women of child bearing age who present with abdominal, back or loin pain must have a pregnancy test to rule out an ectopic pregnancy.

**Box 4**

## Imaging

## IVU

**Benefits**

Demonstrates anatomy better  
Easy to perform  
Tells if obstruction is partial or complete

**Drawbacks**

Needs intravenous access and contrast  
(risks of nephrotoxicity and anaphylaxis)  
Requires information about metformin use and creatinine  
Operator dependant  
Time length

## Non contrast CT

**Benefits**

Quick shows >95% of stones (even those that are small and non-obstructing). Identifies other pathology like diverticular disease, appendicitis or pelvic pathology that could account for the patients symptoms. Also picks up incidental findings such as renal lesions and gallstones.

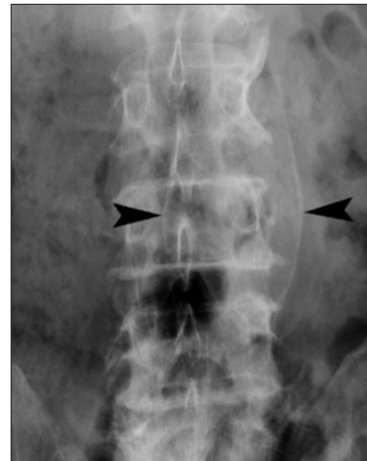
**Drawbacks:**

Cannot tell whether obstruction is partial or complete  
Increased radiation dose

**Box 5****X-Ray kidneys, ureters and bladder (KUB):**

60% of stones are visible on plain film. Look for visible opacities over the renal shadows and along the course of the ureter.

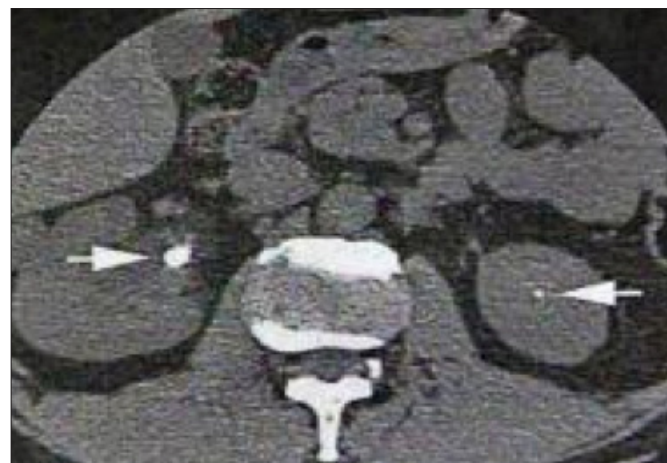
Also look for any calcification of the aorta that may suggest abnormal aneurysmal dilatation (FIG 1).



**FIG 1: Example of KUB showing calcified AAA**



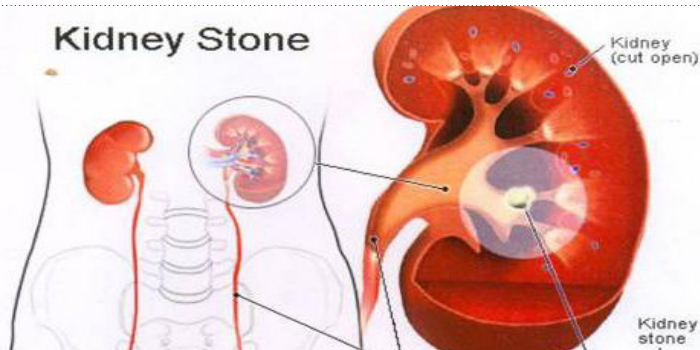
**FIG 2: KUB showing right renal stone and some opacities in the pelvis**  
Phleboliths in the pelvis may look like stones but are much rounder with a central area of lucency.



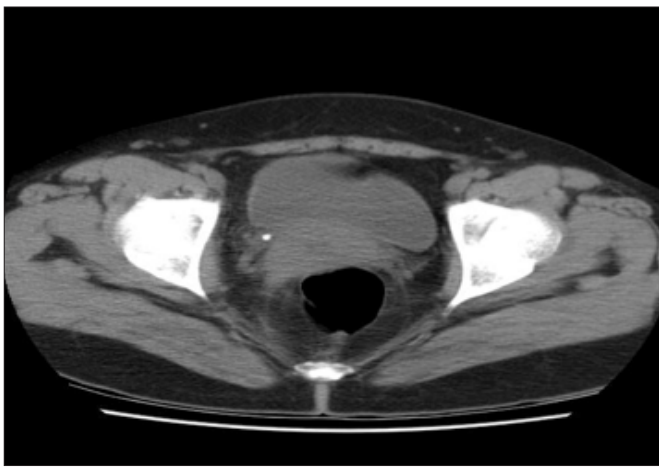
**FIG 3: The non contrast CT shows a stone in the right kidney as well as a smaller stone in the left kidney**

## CASE-BASED DISCUSSION – RENAL COLIC

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### Case-Based Discussion – Renal Colic. Patient Management.



**FIG 4:** The non contrast CT shows a stone in the right lower ureter (vesico ureteric junction)



**FIG 6:** This shows a hold up of contrast in the right upper ureter due to a stone causing an obstruction. Notice how there is no passage of contrast beyond this area into the lower ureter on this film indicating high grade obstruction. The left side appears to drain normally.



**FIG 5:** This shows a normal IVU with delineation of both pelvic and calyceal systems. Notice how the ureters generally follow along the tips of the transverse processes. Bear this in mind when looking for stones along the course of the ureter on a plain X-ray KUB.

Remember that although the IVU shows drainage bilaterally, it can however miss small non obstructing stones. It also won't show up any other possible causes for ongoing pain such as gallstones (FIG 7) or acute appendicitis that could be picked up on CT (FIG 8).



**FIG 7:** Gallstone in distended gallbladder

## CASE-BASED DISCUSSION – RENAL COLIC

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**FIG 8: Distended appendix (see arrows)**

### Subsequent Management

#### Depends on the patient's condition:

##### Unstable:

Are there signs of sepsis or obstruction? Needs urgent antibiotics and decompression by stent or nephrostomy.

##### Stable:

If the patient is stable with no features of sepsis or obstruction then management depends on:

#### (a) Stone Factors: site, size, lucency, shape

Watch and wait  
 Extracorporeal shock wave lithotripsy (ESWL)  
 Endoscopic (rigid or flexible ureteroscopy with laser fragmentation to stone)  
 Percutaneous nephrolithotomy (PCNL)  
 Open removal (very rare)

#### (b) Patient Factors: overweight, occupation, co-morbidities

Large patients may make stone localisation by x-ray or ultrasound difficult and be less likely to respond to ESWL.

##### Ureteric Stones:

Chances of spontaneous passage depends on size. Less than 5mm, 90% pass spontaneously. Average time for spontaneous stone passage for stones 4-6mm is 3 weeks. Stone not passed within 2 months are unlikely to do so. Alpha adrenergic blockers may aid ureteric stone passage (e.g. Tamsulosin 400mcg).

##### Renal Stones:

Small asymptomatic stones are usually suitable for follow up. Larger stones, especially in young patients should be treated. Symptomatic stones also warrant treatment. The modality of treatment will depend on stone and patient factors. Staghorn stones usually are best managed by a percutaneous approach (PCNL) while smaller stones can be effectively cleared by shock wave therapy (ESWL).

### Advice To Stone Formers

All patients with proven stones should be offered dietary advice to reduce future stone formation. Recurrent stone formers will also undergo a metabolic stone screen and workup to look for any underlying factors that may increase their risk of stone formation.

### Discussion

In the case of the patient above, he remained stable throughout and his non contrast CT showed a small stone at the vesico ureteric junction. As his pain was controlled with oral analgesia, he was managed conservatively and started on Tamsulosin 400mcg to aid stone passage. His follow up X-ray KUB 2 weeks later showed the stone has passed. He was given dietary advice and discharged.

### Self Assessment – Best Of Five

**Q1) A 75 year old man is referred to you with suspected renal colic. He gives a history of left sided abdominal pain associated with a recent history of collapse. Urine dipstick is positive for blood. He has a history of hypertension and hypercholesterolemia. What is the most important condition to exclude?**

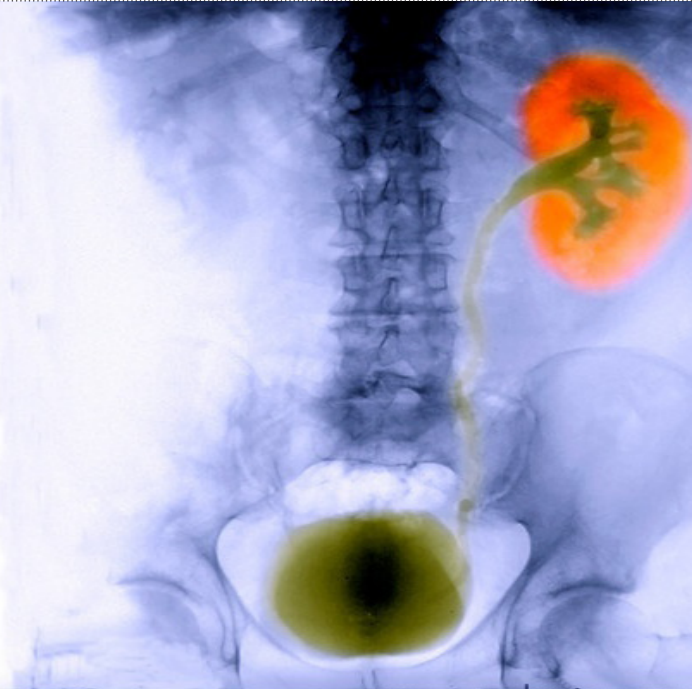
- ureteric stone
- diverticular disease
- pneumonia
- ruptured or leaking abdominal aortic aneurysm
- urinary tract infection

**Q2) What is the INITIAL modality of imaging in a patient referred with suspected renal colic?**

- Computerised tomogram (CT scan)
- Ultrasound scan
- X-ray KUB
- Magnetic resonance imaging (MRI) scan
- Intravenous urogram (IVU)

## CASE-BASED DISCUSSION – RENAL COLIC

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### Case-Based Discussion – Renal Colic. Patient Management.

#### Intravenous urogram (IVU):

Used to be the investigation of choice but has since been replaced by non contrast computerised tomographs (CT). Indicated if non contrast CT not available.

#### Non contrast CT:

More than 95% of stones are visible on CT.

#### Ultrasound scans (USS):

USS can be useful in pregnant females with suspected renal colic or if urgent imaging is required to exclude an obstructed, hydronephrotic kidney. It is also able to look for an aortic aneurysm but will give no real indication of leakage.

**Q3) You are asked to see a patient on the ward with a known ureteric stone. She complains of increasing amounts of pain and is now pyrexial. She feels unwell and has rigors. What should your initial management involve?**

- a) organize an urgent ultrasound scan to look for obstruction
- b) resuscitation with oxygen, fluids, and antibiotics
- c) contact the radiologist for a nephrostomy
- d) administer morphine to keep her pain free
- e) advise her to drink lots of fluids in order to pass the stone

**Q4) An elderly patient with chronic renal impairment and suspected renal colic underwent an IVU earlier today and now has deranged renal function. What is the most likely cause?**

- a) dehydration
- b) contrast allergy
- c) passage of stone
- d) contrast induced nephrotoxicity
- e) renal artery stenosis

**Q5) Non steroidal anti-inflammatories work by**

- a) inhibiting angiotensin converting enzyme
- b) potentiating the effects of prostaglandin
- c) causing degeneration of the pain fibres
- d) inhibiting the enzyme cyclooxygenase
- e) vasodilatation of the renal artery

### Answers

d; c; b; b; d

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### Erectile Dysfunction

Erectile dysfunction is a common male disorder of sexual function and is defined as the inability to achieve and maintain an erection satisfactory for sexual intercourse. The Male Massachusetts Aging Study (MMAS) provides data one of the largest cohorts of men (n = 1290, age 40–70 years) and estimates that 150 million men worldwide experience some degree of erectile dysfunction. When this data is extrapolated from worldwide demographics it is estimated that by 2025 this figure is likely to double.

**A 61 years old diabetic patient presents to his General Practitioner complaining that his erections are progressively getting weaker. The problem has been present for several months but is now causing marital difficulties.**

### What is the definition of Erectile Dysfunction (ED)?

This is the inability to achieve or maintain an erection sufficient for sexual performance.

### Which are the key questions to ask in the history?

The key points that need to be ascertained from the history are any other risk factors for (ED) and whether this is an organic or psychogenic disorder.

1. Ask the patient whether the onset of ED was sudden or gradual and whether it occurs only in specific scenarios.
2. Does the patient still have early morning erections?
3. How severe is the ED. The use of a validated questionnaire such as the IIEF is required (see blow)?
4. Has any treatment been attempted yet?
5. Are there specific underlying risk factors?

### Which additional risk factors would you be looking for?

This patient has one major risk factor which is diabetes. Additional risk factors include:

1. Radical pelvic surgery e.g., radical prostate surgery, cystectomy.
2. Neurological conditions e.g., multiple sclerosis, Parkinson's disease, poliomyelitis, spinal cord injury and spina bifida.
3. Renal failure treated by dialysis or transplant.
4. Risks factors related to ischaemic heart disease e.g., smoking, hypertension, dyslipidaemia.
5. Medication which may be associated with erectile dysfunction e.g., antihypertensive treatment, some antidepressants, 5 -D reductase inhibitors.



### What are the key physiological stages involved in gaining a penile erection?

In order to gain a penile erection the cavernous smooth muscle within the two corpora cavernosa as well as the arterioles need to dilate. A series of mechanisms then maintains the penile erection.

1. The release of neurotransmitters following sexual stimulation results in smooth muscle relaxation and therefore more blood enters the penis.
2. The trapped blood expands the sinusoids in the corpora cavernosa.
3. The subtunical venules which are located between the tunica albuginea and the peripheral sinusoids are compressed and therefore reduce the venous outflow (see Fig 1).

### How would you examine this patient?

When examining the patient, the emphasis should be on the neurological, vascular and reproductive system. The body mass index and blood pressure should be recorded. Examination of the penis should record the presence of any fibrous plaques which would be indicative of Peyronies disease. For completeness a thyroid examination and rectal examination should be documented.

### Are there any investigations that should be performed?

Extensive investigations are not usually required initially. These are reserved for more complex cases or those which are refractory to medical treatment. However, for newly diagnosed patients the following tests should be performed:

1. Urine dipstick – check for undiagnosed diabetes or haematuria.
2. Fasting glucose and lipids.
3. Total testosterone – best performed as an early morning testosterone between 8 am and 11 am.
4. Some guidelines would also recommend thyroid function tests and prolactin levels.
5. The patient scan also completes a questionnaire called the International Index of Erectile Function (IIEF). Generally a shortened version called the IIEF-5 is more specific to erectile function (see Fig 2).

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#### How would you treat this patient?

This patient has one major risk factor which is diabetes which needs to be well controlled. Combine this with lifestyle changes such as regular exercise, weight control and smoking cessation.

Pharmacological treatment using phosphodiesterase inhibitors (PDE-5i) is usually the first line of treatment.

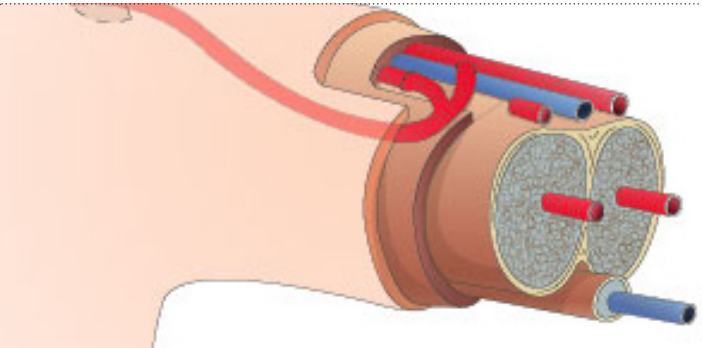
#### How do PDE-5i work?

The smooth muscle dilatation in the penis is the result of a series of pathways which ultimately results in an increase in the intracellular messenger cGMP within the smooth muscle. The first step involves the activation of soluble guanylate cyclase (sGC) which converts GTP to cGMP which triggers a series of intracellular events including a reduction in the intracellular calcium levels resulting in smooth muscle relaxation. The action of cGMP is terminated by metabolising it to the inactive form GMP by phosphodiesterase-5 (PDE-5). However, by using drugs which inhibit PDE-5, the smooth muscle relaxation is facilitated by accumulating cGMP (see Fig 2).

The patient would like to know about the different PDE-5 inhibitors that are currently available to be prescribed.

#### PDE-5 inhibitors

There are currently three PDE-5 inhibitors approved and available for clinical use. Sildenafil (Viagra®) was developed in 1998 as the first selective PDE-5 inhibitor (IC50 3.5nM). The time to onset is 30–60 minutes and the half life of sildenafil citrate is between 4–5 hours. It is recommended that sildenafil should be taken on an empty stomach and patients are encouraged to use it on at least eight occasions before considering alternative options. The normal starting dose is 50mg which can be increased to 100mg. In 2003 two alternative PDE-5 inhibitors were approved, tadalafil (Cialis®) and vardenafil (Levitra®). Tadalafil has a half life of 17.5 hours which allows for a greater deal of spontaneity after drug administration. The starting dose for tadalafil is 10mg which can be increased to 20mg. A once daily dose of 5mg is also available and is used in patients following major pelvic surgery to encourage penile rehabilitation. Vardenafil has a half life of 4.5 hours but appears to have a marginally more rapid onset of action. Clinically there is very little difference in the erectile response using these agents and the main contra-indication to all of them is concomitant nitrate use by the patient which can cause significant hypotension.



**This same patient undergoes successful treatment with a PDE-5i for several years but then returns to your clinic complaining that they no longer work as well as before. Which alternative options are available to him?**

This is a common scenario whereby the medication works for a period but due to disease progression, the efficacy is reduced despite using the drugs at the maximum dose.

The synthetic PGE1 analogue alprostadil can be administered as a second line therapy in those who have failed oral pharmacotherapies or have a specific contra-indication to treatment with oral agents. PGE1 increases the intracellular concentrations of the second messenger cAMP resulting in corpus cavernosum smooth muscle relaxation. Currently two methods of administration are available, direct intracavernosal injection (80% response rate) or intraurethral application of a small pellet (MUSE dose 250µg–1000µg, 65% response rate). This second line treatment is useful in patients with long standing diabetes or erectile dysfunction secondary to pelvic surgery who have a higher incidence of erectile dysfunction refractory to oral pharmacotherapies.

#### What if all of the medical therapy fails in this patient?

This is end stage erectile dysfunction which is refractory to medical treatment and therefore the options include the use of a vacuum device or surgical intervention by inserting a penile prosthesis.

#### Vacuum Devices

These devices are useful in patients with psychogenic or organic erectile dysfunction and can be used alone or in combination with other therapies. An external cylinder is utilised to create a negative pressure and penile tumescence is maintained by means of a constriction ring at the base of the penis. The reported patient satisfaction rate is 50–70%.

#### Insertion of Penile Prosthesis

The insertion of a penile prosthesis is suitable for patients with severe organic erectile dysfunction. Two main subtypes of prosthesis are available, malleable (or semi-rigid) and inflatable. The malleable devices have the advantages of decreased mechanical breakdown, easier placement and lower cost. Inflatable devices are available as one, two or three piece devices. The two and three piece devices (see Fig 3) have a pump placed in the scrotum

which controls the inflation and deflation of the device and therefore requires an element of patient dexterity. The complications include infection rates of up to 2–3% and re-operation rates for mechanical failure of 15% by 10 years. The patient satisfaction rate is over 85% following the insertion of an inflatable penile prosthesis.

**Conclusions**

With a better understanding of the underlying pathophysiology of erectile dysfunction combined with the development of PDE-5 inhibitors, major advances have been made over the last two decades in treating an ever increasing male condition. The common denominator of endothelial dysfunction in erectile dysfunction and vascular disease has now led to clinicians using erectile dysfunction as an early cardiovascular risk factor. Although PDE-5 inhibitors have a high efficacy rates, there are still a significant number of non-responders in the diabetic population.

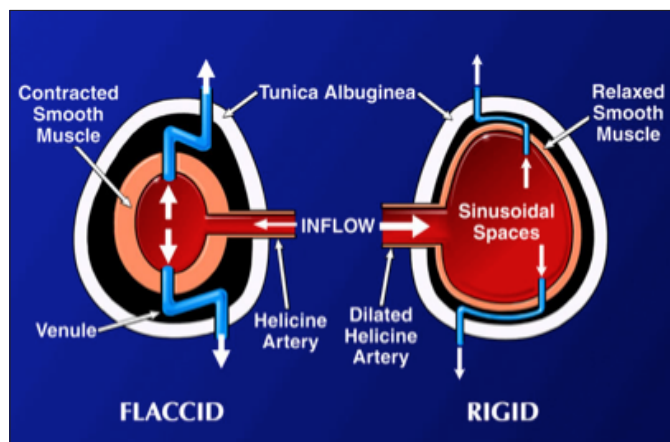
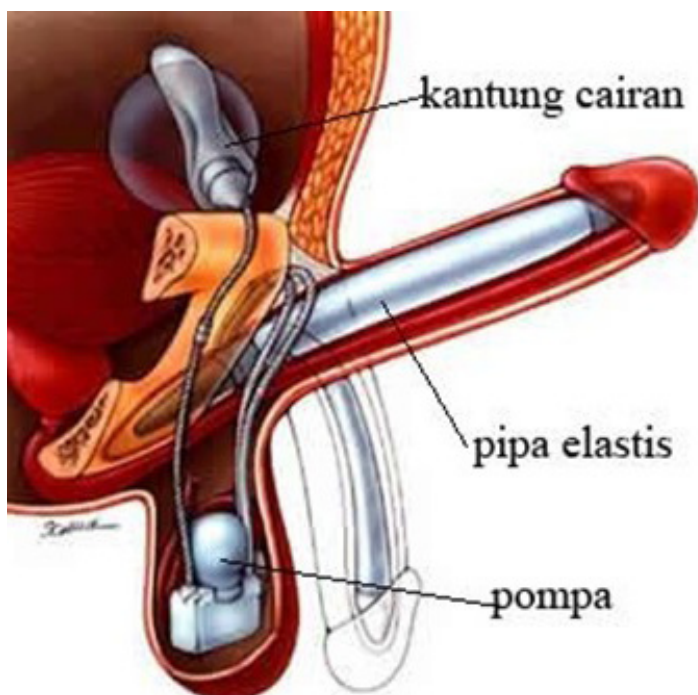


Fig 1. Illustration of the mechanism resulting in a penile erection.



1. How do you rate your confidence that you could get and keep an erection?		Very low	Low	Moderate	High	Very high
		1	2	3	4	5
2. When you had erections with sexual stimulation, how often were your erections hard enough for penetration (entering your partner)?	No sexual activity	Almost never/never	A few times (much less than half the time)	Sometimes (about half the time)	Most times (much more than half the time)	Almost always/always
	0	1	2	3	4	5
3. During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?	Did not attempt intercourse	Almost never/never	A few times (much less than half the time)	Sometimes (about half the time)	Most times (much more than half the time)	Almost always/always
	0	1	2	3	4	5
4. During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?	Did not attempt intercourse	Extremely difficult	Very difficult	Difficult	Slightly difficult	Not difficult
	0	1	2	3	4	5
5. When you attempted sexual intercourse, how often was it satisfactory for you?	Did not attempt intercourse	Almost never/never	A few times (much less than half the time)	Sometimes (about half the time)	Most times (much more than half the time)	Almost always/always
	0	1	2	3	4	5

Fig 2: IIEF-5 which is a validated questionnaire for assessing erectile dysfunction. Maximum score is 25.

- 1–7 Severe ED
- 8–11 Moderate ED
- 12–16 Mild to Moderate ED
- 17–21 Mild ED
- 22–25 No ED



Fig 3: AMS 700CX 3 piece inflatable prosthesis

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## Peyronie's Disease

Over 250 years have elapsed since induratio penis plastica was first described by Francois Gigot de la Peyronie, surgeon to Louis XV. Peyronie's disease is a benign condition characterised by the presence of fibrous plaques in the tunica albuginea combined with a penile deformity.

This condition is estimated to affect between 1–3% of the male population with a peak incidence occurring in the fifth decade. The prevalence of Peyronie's disease increases with age. A questionnaire based study found that 6.5% of respondents over the age of 70 reported palpable plaques in the penis compared to 4% between the ages of 40 and 59.

## Case Study

A 55 years old presents with a 4 month history of pain in the penis, penile curvature and a palpable lump on the dorsum of the penis.

## What are the key points to ask in the history?

It is important to evaluate the erectile function and the degree of the deformity. The erectile dysfunction can be assessed using the IIEF questionnaire. The use of pharmacotherapies to improve the erectile function also needs to be documented as this may influence the type of surgical intervention that is offered to the patient. Although some patients may have significant penile curvatures, they may still be able to have penetrative intercourse. A previous history of penile trauma can result in the development of penile curvature and a fibrous plaque.

Younger patients should be specifically asked about the duration of the curvature particularly if there is an absence of the palpable plaque as this would indicate that they may have a congenital penile curvature.

There are a number of reported associations with Peyronie's disease as listed in table 1:

Dupuytren's contracture
HLA B27
Ledeshore's disease
Tympanosclerosis
Cigarette smoking
Paget's disease
Diabetes

## How would you examine this patient?

The location of the plaque should be documented and also whether it is associated with pain. The hands should be examined to check for co-existing Dupuytren's contracture. The curvature with the penis erect is then assessed either by the use of digital photographs that the patient brings to the clinic or by using intracavernosal alprostadil in the clinic in order to assess the angulation. The use of intracavernosal prostaglandin injections is the most accurate method to assess the degree of curvature.

## What is the pathogenesis of Peyronie's disease?

The most common theory is that recurrent micro-trauma of the tunica albuginea during sexual intercourse leads to a subcutaneous bleed that activates the process of wound healing and the subsequent development of a fibrous plaque.

## This particular patient would like to know about the natural history of the disease.

There are two distinct phases to the disease. During the active phase of the disease, patients will suffer from penile pain and a progressive penile curvature. During the chronic phase of the disease the deformity stabilises and the pain will subside. A small proportion of patients (about 14%) can have a resolution of the condition although the majority will stabilise with a penile deformity after about 6–12 months. It is important to distinguish between the two phases as surgical intervention should not be performed during the active phase of the disease.

## Are there any medical treatments available?

Oral medical therapy which has been used is based mainly on anecdotal evidence and is primarily utilised during the acute phase of the disease. These include Vitamin E, Tamoxifen, Para-aminobenzoate (POTABA), colchicines, L-arginine and pentoxifylline. Alternative options include topical and intralésional injection therapy (using steroids, verapamil or interferons, extracorporeal shockwave therapy, and iontophoresis.



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The patient returns 9 months later. The pain has settled and the curvature is as shown in Fig 1. He is finding it difficult to have penetrative intercourse. What are his treatment options now?

Provided that the disease is stable with no progressive curvature, he may undergo surgical intervention in order to straighten the penis. These are divided into procedures which will shorten the convex side (e.g., Nesbit procedure) or those which incise and lengthen the plaque by using a grafting technique (e.g., Lue procedure). The most frequently performed procedure is the Nesbit procedure as the risk of erectile dysfunction is less than that for incision and grafting procedures. However, those patients who have significant curvatures (>60°) may still require an incision and grafting procedure.

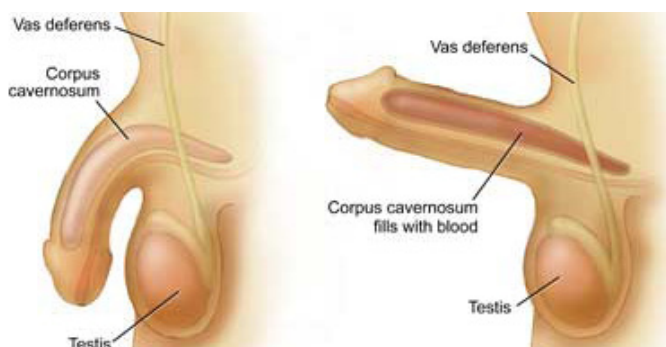
What are the risks of this type of surgery that the patient should be informed of preoperatively?

Informed consent is important in this group of patients as the satisfaction rate following surgery can be significantly lowered if the expectations are not fully discussed before undergoing the procedures. The risks and side effects include:

1. Bruising of the penis,
2. Wound infection,
3. Penile shortening,
4. Glans hypoaesthesia,
5. The sutures may be palpable,
6. The development of erectile dysfunction,
7. There may be a small residual curvature. Although plication techniques can straighten the penis completely, this has to be balanced with the degree of shortening and therefore a residual 10° is acceptable as it will not interfere with sexual intercourse,
8. Recurrent curvature may occur due to activation of the disease at another site or due to failure of the primary procedure.

If this patient had significant erectile dysfunction associated with the curvature, which alternative surgical option is there?

Penile curvature or complex curvatures (e.g., hour glass deformity) associated with erectile dysfunction is an indication for a penile prosthesis. This will allow penetrative intercourse as well as correcting the curvature. By inserting an inflatable penile prosthesis, the inflatable cylinders can correct the penile deformity.



## Conclusion

There have been significant advances over the last decade in our understanding of the pathophysiology of Peyronies disease. Good therapeutic oral pharmacotherapies have yet to be developed for use in patients presenting with chronic disease where penile deformity and erectile dysfunction are well established components of the disease process. Surgical correction still remains the best option in correcting the penile deformity due to Peyronies disease but should be reserved for non-painful and stable disease. Both the patient and the partner require a clear understanding of the nature of the disease and expectations of any surgical procedure.



Fig 1.

## Male Hypogonadism

A 60 years old man is referred to your clinic complaining of fatigue erectile dysfunction and a reduced libido.

## How would you assess him?

As part of his investigations for erectile dysfunction this patient should have a fasting glucose and lipid profile together with a hormone profile which includes the total testosterone.

**The total testosterone is found to be 8nmol/l on a morning sample. How would you investigate this further?**

Circulating total testosterone is found in three forms. Firstly, the bioavailable testosterone comprises the free testosterone (2 %) and also that bound to albumin (30%). The majority of serum testosterone (65%) is tightly bound to sex hormone binding globulin (SHBG) and is not bioavailable. Calculation of the free testosterone is a more accurate marker of the physiologically available total testosterone. Alterations in the SHBG levels will result in an inaccurate estimate of the biologically active (free testosterone) concentration. Therefore the blood tests should be repeated to include the FSH, LH, SHBG and albumin levels.

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#### How is male hypogonadism classified?

Men with classic primary hypogonadism are found to have elevated serum LH and FSH levels with a low testosterone and testicular failure. The testicles are frequently soft and of a small volume. The underlying causes of primary hypogonadism are shown in Table 1.

Secondary hypogonadism (hypogonadotropic hypogonadism) may be congenital or acquired and characteristically men are deficient in LH and FSH resulting in reduced testosterone secretion and disrupted spermatogenesis. Congenital cases are referred to as Kallman's syndrome which is also associated with anosmia and has an incidence of approximately 1:10000 males. A variant of this syndrome is referred to as adult onset or acquired IHH. Here men have normal pubertal development and previous fertility but present with impotence and new onset infertility. The commonest cause is a prolactin secreting tumour. In acquired hypogonadotropic hypogonadism it is recommended that patients should undergo testing for prolactin levels, serum iron and iron binding capacity (exclude haemochromatosis) and undergo MR imaging of the hypothalamus and pituitary.

Age related or late onset hypogonadism is a mixed picture of primary and secondary hypogonadism. The total testosterone levels decline with age resulting in the development of a range of symptoms in older men (see Fig 1). Commonly the presenting features are related to erectile dysfunction and a loss of libido.

#### What is the diagnosis in this patient?

This patient has developed sexual symptoms in combination with a low serum testosterone. This can be due to the development of late-onset male hypogonadism. This is defined as a symptom complex resulting from the age-related decline in testosterone levels in men. Several population-based studies have demonstrated that serum testosterone levels fall with age

#### How can you treat this patient?

Provided that there are no contra-indications, this patient is suitable for testosterone replacement therapy. The presence of active prostate or breast cancer is an absolute contra-indication to treatment.

Polycythaemia, or an excessive increase in the number of red blood cells, may be seen in some men over age 50 who have been treated with testosterone replacement. Therefore pre-existing polycythaemia is a contra-indication. Hypogonadal men who are treated with testosterone may develop or may have an exacerbation of obstructive sleep apnoea.

Testosterone is an anabolic agent that also increases the retention of nitrogen, sodium, potassium, and water. Men with diseases such as congestive heart failure, liver failure, or renal failure, which cause fluid retention, may experience a worsening of these conditions when treated with testosterone. Thus, testosterone replacement therapy is to be avoided in men with stage III or IV heart failure or severe renal or liver failure.

#### How is testosterone replacement administered?

As this is a long term treatment, the method of administration of the drugs is aimed at ensuring ease of use and patient compliance. There are a number of preparations available for testosterone replacement. These are listed in Table 1. Some preparations are short acting and others have a longer duration of action and benefit for those who are likely to be non-compliant. When commencing treatment, one of the short acting preparations (patch or gel) is preferred so that the treatment can stop in the case of any adverse events. If the treatment is tolerated then one of the longer acting preparations can be used. Before commencing any testosterone replacement therapy the physician should ensure that the patient has undergone a complete baseline screen (see below) and that there are no absolute contra-indications to testosterone replacement.

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Route	Drug	Preparations(examples of commercially available preparations)	Starting Dose	Maintenance Dose
Oral	Testosterone undecanoate	Restandol®	120-160mg od	40-120mg od
Buccal	bioadhesive Testosterone tablet	Striant®	30mg bd	30mg bd
Transdermal gel	Testosterone	Testogel®	50mg od	According to response
Transdermal Patch	Testosterone	Andropatch®	2.5-7.5mg od	According to response
Intramuscular System	Testosterone undecanoate	Nebido®	1000mg First interval 6 weeks	1000mg Every 10-14 weeks
	Testosterone propionate, testosterone phenylpropionate, testosterone isocaproate and testosterone decanoate	Sustanon 250®	1ml every 2 weeks	1ml every 2 weeks
Implants	Testosterone		100-600mg	600mg every 6 months

Table 1: Testosterone preparations available

How would you monitor a patient once testosterone replacement therapy has been commenced?

Patients should be monitored on a regular basis. In particular following commencement of short term therapy, patients should have their liver function tests, and lipid profile checked. Symptomatically, the clinician should check for negative behaviour patterns and the exacerbation of obstructive sleep apnoea as well as establishing as to whether the treatment has made any significant difference. Long term monitoring includes FBC to check for erythrocytosis and also 3 monthly PSA and DRE for the first year followed by annual checks. A repeat DEXA scan can be performed after 2 years of treatment.

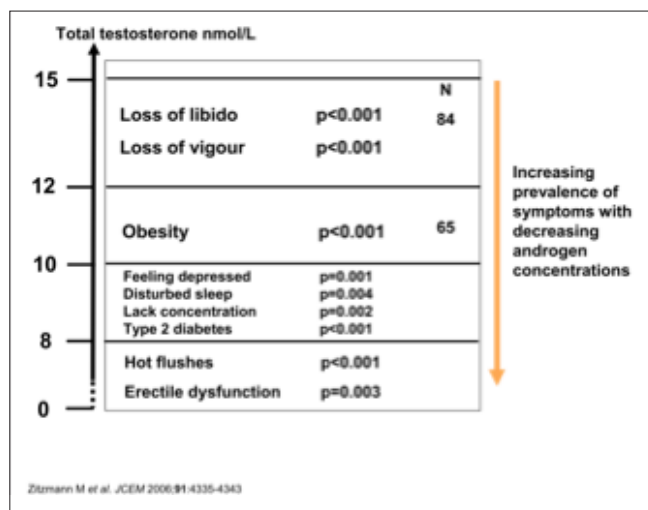


Figure 1. Development of symptoms related to serum testosterone levels.

Conclusion

With an increase in the ageing population and an increased incidence of obesity, type II diabetes and metabolic syndrome, androgen deficiency is becoming a topic of interest throughout a number of specialties. The indication for testosterone replacement depends on the presence of both symptoms and a biochemically detected low testosterone. There are now guidelines available from the European Association of Urology which defines low testosterone levels and the indications for treatment.



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## Andrology MCQs (SBA)

**1. Which of the following intracellular secondary messengers is primarily involved in smooth muscle relaxation during an erection?**

- a. cAMP
- b. cGMP
- c. IP3
- d. DAG
- e. Mg<sup>2+</sup>

**2. Which of the following treatment options for erectile dysfunction has the longest half life?**

- a. sildenafil
- b. alprostadil
- c. vardenafil d

**3. Which of the following is an absolute contra-indication to the use of a PDE-5 inhibitor**

- a. Hypertension controlled by D blockers
- b. Angina treated by oral nitrate therapy
- c. Atrial fibrillation controlled by digoxin
- d. Hypertension treated by ACE



**4. Which of the following is true regarding Peyronie's disease**

- a. Surgery is always required in this condition
- b. The chronic phase of the disease is associated with pain
- c. Severe angulations with erectile dysfunction should be treated by an incision and grafting procedure
- d. A Nesbit procedure is associated with penile shortening
- e. A penile prosthesis should never be inserted in the presence of a penile plaque

**5. Which one of the following is the majority of circulating testosterone bound to**

- a. Albumin
- b. D1-chymotrypsin
- c. SHBG
- d. calmodulin
- e. non of the above

## Answers

B, D, B, D, C

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## CASE-BASED DISCUSSION - BENIGN SCROTAL SWELLINGS

Rono Mukherjee, Agapios Gkentzis, Sachin Malde

### Case-Based Discussion - Benign Scrotal Swellings. Good Clinical Care.



#### Introduction

Scrotal swellings are frequently seen in children and adolescents and are not uncommon in the adult population. The list of differential diagnoses is vast but, as in all patients, can be narrowed down by a thorough history and physical examination<sup>1</sup>. Since the potential causes range from mundane to life-threatening, patients may present to their general practitioner or acutely to the emergency department. Therefore, its relevance is widespread.

#### A Man Presents to A&E with an Acute Swelling of his Right Testicle

##### What would you do next?

As always, a thorough history and physical examination is essential to distinguish between the numerous potential causes.

#### History

##### 1. Presenting Complaint:

- When did the patient first notice the swelling?
- How did he notice the swelling, was there a history of trauma?
- Was the onset sudden, suggesting torsion
- Is the swelling painful, suggesting torsion or epididymo-orchitis
- Is it enlarging? Do specific activities (such as coughing) cause an enlargement, suggesting an inguinal hernia or communicating hydrocoele?
- Any alleviating or exacerbating factors, such as with a varicocele.
- Any other lumps noticed?
- Any urinary symptoms (dysuria, frequency, haematuria), suggesting epididymo-orchitis.
- Any back pain, haemoptysis, breathlessness or weight loss- suggesting metastatic testicular cancer.

##### 2. Past Medical History:

- Any conditions that may point to a cause? (Such as, chronic cough, constipation, bladder outflow obstruction.)

##### 3. Sexual History:

- A detailed sexual history is important to identify those at risk of gonorrhoea or Chlamydia causing epididymo-orchitis.

##### 4. Family History of testicular cancer.

#### Examination

##### Need to answer below questions:

1. Can you get above the swelling? (To exclude an inguinoscrotal hernia.)
2. Can you identify the testis and epididymis separately? (To exclude a hydrocoele.)
3. Does the swelling transilluminate?
4. Is the swelling tender?

Continue the examination as for all lumps to elucidate the site, size, surface features and consistency of the swelling, and check for a cough impulse to exclude an inguinoscrotal hernia.

##### Case 1:

A 45 years old man presents to his GP with a left hemiscrotal swelling. He is accompanied by his girlfriend and they are clearly anxious.

##### What would you like to do next?

A detailed history and examination as above is required. He says that the swelling has been present for 9 months, but over this time has gradually enlarged to the point where his underwear no longer fits. It is not painful, and is present at all times. He denies any history of trauma, and has had no previous testicular infections. He has no urinary or systemic symptoms, and there is no family history of testicular cancer. Examination reveals a soft, fluid-filled swelling of the left side of the scrotum, an impalpable testis, but a palpable cord above the swelling. It is confined to the scrotum, is non-tender, and brilliantly transilluminates.

##### What do you think is the cause of this man's scrotal swelling?

This patient has a hydrocoele, which is likely to be idiopathic.

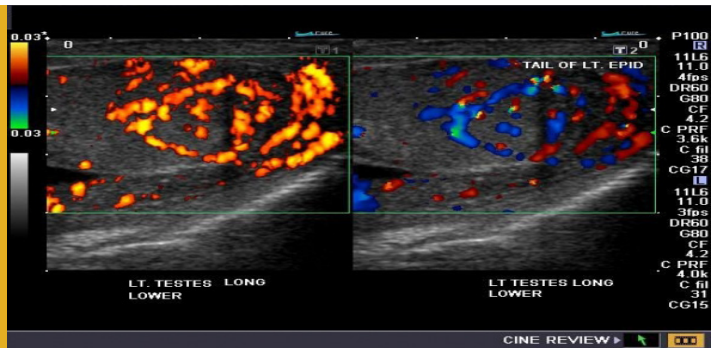
##### What other areas are important to examine?

Complete an abdominal and digital rectal examination and examination of the regional lymph nodes. This will help to exclude an underlying cause for this man's hydrocoele such as a malignancy.

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#### What is a hydrocoele?

A hydrocoele is a collection of serous fluid within the tunica vaginalis, the innermost lining of the testicle.



Figure 1: A right-sided hydrocoele

#### What are the possible causes of a hydrocoele?

Hydrocoeles can be classified into communicating or non-communicating, based on whether the processus vaginalis (the connection between the peritoneum and the tunica vaginalis which normally closes by 18 months of age) is patent or not. Communicating hydrocoeles are more common in children and congenital in nature. Causes of non-communicating hydrocoeles are shown in the table below:

#### Causes of non-communicating hydrocoeles

Primary	Secondary
Idiopathic	Trauma
	Epididymo-orchitis
	Tumour
	Torsion
	Iatrogenic-post-varicocele surgery
	Lymphatic obstruction, e.g., filariasis

#### What would you do next?

As the underlying testis is not palpable, an ultrasound scan will help to exclude any underlying testicular abnormality. Sometimes, hydrocoeles can be difficult to distinguish from incarcerated inguinal hernias and in this situation a plain abdominal radiograph may help to distinguish between the two. If epididymo-orchitis is suspected as the cause, urinalysis and urine culture are essential.

#### What are the management options?

Since the patient has no discomfort or infection of his hydrocoele, he can be reassured that there is no underlying cause for his symptoms. In this situation, management is conservative, with scrotal supports.

If the patient is in discomfort or wants the hydrocoele repaired for cosmetic reasons, then the options are:

- Surgical repair - involves opening the tunica vaginalis through a scrotal incision, draining the hydrocoele fluid, and then inverting the tunica vaginalis (Jaboulay procedure) or excising it.
- Aspiration and injection of sclerosant- for patients who are unfit for surgery, but the recurrence rate is much higher than for surgical repair (100% for simple aspiration, 50% if sclerosant) and recurrence is almost universal over a variable time frame?

#### Case 2

17 years old patient presents to A+E complaining of sudden onset acute right testicular pain for a three hours.

#### What is your first thought?

The patient has testicular torsion until proven otherwise, especially anyone in their teens (90% of acute scrotal presentations).

#### What are the most important questions you should ask?

- When did the pain start? There is a narrow time window (approximately 6h) before the testicle infarcts!
- Did it start suddenly? Indicate vascular occlusion.
- Is there any abdominal pain or vomiting?
- Was there any recent scrotal injury? 4-8% could be related to trauma.
- When did he last eat/drink? (The anaesthetist will want to know – may need rapid sequence induction.)

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### What do you expect to find on scrotal examination if the patient has torsion?

- Patient will be reluctant to let you palpate it, i.e., very tender.
- High-riding swollen testicle, difficult to feel above it, (not always present).
- Absent cremasteric reflex (difficult to elicit at the best of times therefore not reliable).

### What investigations would you do to confirm your diagnosis? What is your management plan?

- This is a clinical diagnosis! You should not waste time! The patient must go to theatre ASAP.
- Your role as a junior trainee is to administer adequate analgesia, keep the patient fasted, inform your seniors and the Anaesthetist and book the case in the emergency theatre list.

### Would you consider a scrotal Ultrasound?

The role of scrotal ultrasound (colour Doppler) in diagnosing testicular torsion is limited. You should only consider it, if:

- It is readily available (within minutes!). Even, if it is normal. It should never substitute your clinical impression; the patient should undergo surgical exploration<sup>4</sup>.
- If the patient presented late post symptoms' onset (?missed torsion).

### What are you going to book him for?

Right hemiscrotal exploration +/- right orchidectomy +/- bilateral orchidopexy.

### When would you do orchidectomy?

If the testicle is found to be necrotic (discoloured with no signs of 'pinking up' after leaving it on warm saline soaked swab for 15 min), it should be removed. If there is any doubt as to the viability of the testis, it should be removed.

### What is bilateral orchidopexy?

If you diagnose the torsion but the testicle is viable you 'detort' it and fix it to the overlying layers with non-absorbable sutures. You perform the fixation on both sides to prevent future torsion and confusion!

### What is torsion of hydatid of Morgagni (testicular appendix)?

A Hydatid of Morgagni is a Mullerian-duct remnant. Which may twist on its blood supply causing acute scrotal pain. It is more common pre-puberty (50% of acute scrotal presentations). Examination may reveal a focal tender mass (the "blue dot" sign). Although physical examination accompanied by ultrasound may suggest the diagnosis, many such patients will undergo scrotal exploration, as testicular torsion can still occur in a high proportion of acute scrotal presentations at this age (30%).

### Case 3:

A 24 years old man attends A&E with an acutely painful, swollen left testicle.

#### What are your initial thoughts?

In any young male presenting with acute testicular pain, the diagnosis is testicular torsion until proven otherwise. Therefore, he needs to be assessed urgently with a thorough history and physical examination.

He says that he first noticed the pain when he awoke 2 days ago, but it has got progressively worse since and more swollen. It is localised to the left testicle, and he feels nauseous and feverish. The pain is eased slightly if he supports the scrotum with his hand. He complains of dysuria and mentions that he has recently had unprotected intercourse with his new girlfriend.

On examination, the left testicle is swollen, tender and the scrotal skin is red and hot. The testicle is easily palpable, and the epididymis feels thickened and very tender.

#### What is the likely diagnosis?

The gradual nature of symptoms (over 48 hours), together with the history of dysuria, suggest acute epididymo-orchitis as the cause. Often it can be difficult to differentiate from testicular torsion and if any doubt exists especially in a young man, urgent scrotal exploration is mandatory.



**Figure-** Acute epididymo-orchitis, likely secondary to the indwelling urethral catheter.

### What is an important feature of the history in this case?

It is important to take a thorough sexual history as the cause of acute epididymo-orchitis in men aged <35 years of age is most often due to a sexually-transmitted infection such as Chlamydia trachomatis and Neisseria gonorrhoeae.

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In addition, mumps orchitis is on the rise, as a result of the vaccination state of the current population<sup>5</sup>. Around 20–30% of infected post-pubertal males suffer from this complication as a result of haematogenous spread generally 3–4 days after the onset of parotitis. Antibiotic therapy should be given as a bacterial cause may not be entirely ruled out or due to the risk of secondary bacterial infection (even with an obvious clinical diagnosis of mumps). Remember, mumps is a notifiable disease.

#### What pathogens are commonly responsible in men >35 years of age?

Gram negative enteric organisms (e.g., E. Coli) causing urinary tract infections. In this group, anatomical or functional abnormalities of the urinary tract are common, and so, these men should undergo further investigation<sup>6</sup>. Concomitant bladder outflow obstruction is common in men aged over 60 presenting with epididymo-orchitis. Recent urinary tract instrumentation or the presence of indwelling catheter are risk factors.

#### What other causes of epididymo-orchitis are recognised?

- a) Acute Bacterial (apart from the above) – TB, syphilis.
- b) Acute Non-bacterial – viral, fungal, parasitic e.g., brucellosis, cryptococcus, candida.
- c) Acute Non-infectious:
  - a. Idiopathic
  - b. Traumatic
  - c. Autoimmune – granulomatous or sarcoid (rare)
  - d. Amiodarone-induced (rare)

#### What would you do next?

Urinalysis and urine culture is essential prior to commencement of antibiotic therapy. In men suspected of having a sexually-transmitted infection, a first pass urine or urethral swab should be taken for Chlamydia trachomatis and Neisseria gonorrhoeae. In men over 35 years of age, an ultrasound of the renal tract will exclude an underlying structural abnormality predisposing to urinary infections, and in those suspected of having bladder outflow obstruction uroflowmetry and post-void bladder scanning will aid diagnosis.

#### What else would you advise the patient?

Men suspected of having a sexually-transmitted infection should be advised to consult the sexual health clinic for a full sexually-transmitted infection screen and contact tracing and treatment. Furthermore, these men should be advised to abstain from sexual intercourse until they and their partner have completed treatment.

#### How would you manage the patient?

Patients can be managed in primary care unless they are septic requiring intravenous antibiotics or unless they develop a scrotal abscess that requires drainage. Management consists of bed rest, scrotal support, analgesia and antibiotics based on local guidelines. Antibiotics should be started empirically pending culture results.



Photo of scrotal support

If *Chlamydia trachomatis* is suspected, a 14 days course of doxycycline 100mg twice daily can be given (local guidelines may vary). If *Neisseria gonorrhoeae* or other sexually-transmitted infection is likely, then a single dose of ceftriaxone 250mg intramuscularly can be given followed by doxycycline 100mg twice daily or ofloxacin 200mg twice daily for 14 days (once again, local guidelines may vary) <sup>7</sup>.



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### What complications may develop?

Abscess formation, infarction of the testis, chronic pain and infertility. If an abscess is suspected, a scrotal ultrasound will confirm this prior to definitive surgical drainage.

### Case 4:

A 17 years old male patient is referred to clinic by his GP due to left hemiscrotal pain. He is accompanied by his father who is very concerned.

### What are you going to do?

#### Focused History

He has noticed worsening left hemiscrotal ache for last 2 months. He describes it as a 'constantly heavy' feeling. It gets worse after exercising in the gym or when standing for long periods of time (he works as a waiter). He has not noticed any particular swelling. He denies any injury or any urinary symptoms. He is otherwise fit and well. His father confirms that there is no significant family history of medical problems.

#### Clinical Examination

On inspection there is not much to see. On palpation, in the standing position, you find that he has a compressible non-tender left hemiscrotal swelling which feels like a "bag of worms" and disappears when lying down. It becomes more prominent with the valsalva manoeuvre. Both testicles and epididymi are normal in size and not tender. Transillumination test is negative.

### What do you think the diagnosis is?

The patient has a symptomatic left varicocele.

### What is a varicocele?

It is an abnormal dilatation and tortuosity of testicular veins in the pampiniformis plexus caused by venous reflux. It is found in about 20% of 20 years old male, of which 20% are symptomatic. It appears predominantly on the left side (90%).

### What are the complications of varicocele?

- Pain/variable swelling (esp "dragging" sensation" progressing through the day).
- Testicular atrophy – indication for treatment in children so assess tumour size/volume if suspected.
- ?Infertility (possibly if severe, but controversial – see later).

### Why is it more common on the left side?

The exact aetiology is unknown but may be a result of:

1. The left testicular vein draining almost vertically into the left renal vein and lacking an effective anti-reflux mechanism at the junction (the right testicular vein drains directly into the IVC).
2. Incompetence of more distal venous valves (which normally protect spermatic veins from the hydrostatic pressure transmitted from the inferior vena cava).
3. A "nut-cracker" effect between the draining left testicular vein and the left renal vein, inferior mesenteric vein and inferior vena cava.
4. ?Renal tumours – exceedingly rare, perhaps 1% of childhood varicoeles (with an unusual presentation such as a sudden non-collapsing varicocele on the right side or bilaterally).

### How would you classify the varicocele?

Grade 0 – sub-clinical detected incidentally on ultrasound  
 Grade I – palpable only when Valsalva manoeuvre performed  
 Grade II – palpable at rest (without Valsalva manoeuvre)  
 Grade III – visible at rest

Our patient has a Grade II varicocele

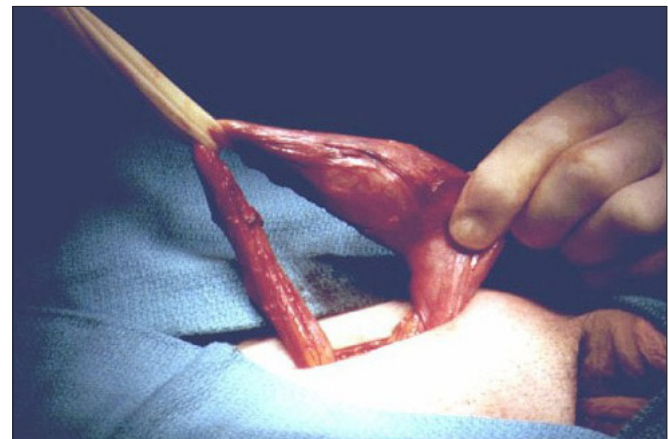


Photo of Grade III varicocele

### What would you do next?

Arrange an ultrasound for confirmation. This will normally be performed with colour-flow doppler in the supine and upright position to confirm the diagnosis, and assess the testicular size.

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#### What is your management plan?

Discuss the indications for treatment with the patient:

- Significant symptoms or cosmesis – quality of life issue.
- Impaired testicular growth in children – >20% or 2ml difference with other testicle – to preserve testicular function<sup>8</sup>.
- Infertility? Counsel as controversial<sup>9</sup>.
  - o There is a higher incidence in infertile men (35% vs. 20%) especially grade III (20% vs. 3%).
  - o Grade III varicoceles appear to cause more severe impairments in sperm quality and correction may improve semen parameters...but improvements in actual paternity rates post-repair are unknown.

If none of the above criteria are met then give simple reassurance and analgesia as required. Annual follow-up should be offered to children, however, with a grade III varicocele to detect any changes in testicular size.

#### What are the treatment options?

- Percutaneous radiological embolisation of the dilated veins – less invasive than surgery with almost equal success rates.
- Surgical ligation – higher risk of testicular artery damage (resulting in atrophy) and secondary hydrocoele (5 – 10%).

	Torsion	Epididymitis	Hydrocoele	Varicocele
<b>Age</b>	10–30 yr, peak in puberty	Any	Any	Any
<b>History</b>	Sudden onset of severe pain + nausea/vomit	Increasing severity pain +/- dysuria	Swelling +/- pain	'bag of worms'
<b>Examination</b>	Swollen, tender, high-riding testicle	Tender thickened epididymis	Swelling attached with testicle, positive transillumination	Compressible swelling, cough impulse
<b>Urinalysis</b>	Normal	Usually signs of infection	Normal	Normal
<b>Ultrasound</b>	Don't waste time! Clinical diagnosis	To confirm diagnosis	Confirm diagnosis and exclude underlying cause	To confirm diagnosis
<b>Management</b>	Theatre ASAP	MSU, treat with Abs	Varies on symptoms and patient's choice	Treat only if symptomatic, and consider if infertility and Grade III lesion?

**Table 1 – Summary of differential diagnoses of benign scrotal swellings (inc tumour) with differential aspects of presentation.**

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## ACUTE PENOSCROTAL EMERGENCIES

Bharat Vissamsetti and Ian Pearce

### Acute Penoscrotal Emergencies. Patient Management.

#### Introduction

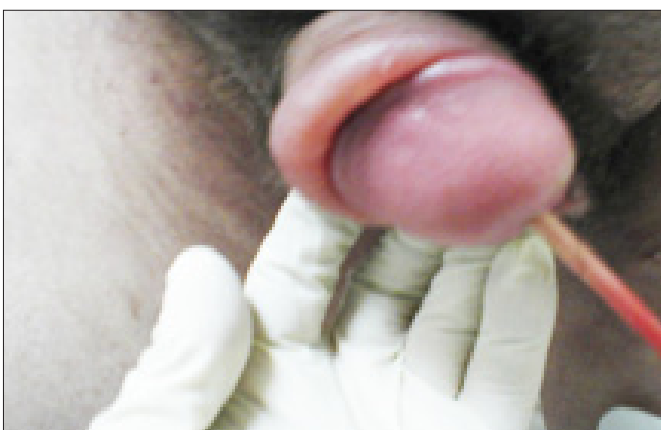
In this article, we aim to highlight those penoscrotal emergencies that may present throughout a urological on call shift. These emergencies, whilst not common are of great interest and can be managed entirely or in part by a Foundation Year doctor.

#### Case 1:

You are asked to see a 66 years old male patient complaining of severe penile pain and swelling. He was previously admitted onto an acute medical ward with acute renal failure the night before and was subsequently catheterised by a trained nurse.

#### What are the important factors in this man's history?

- The patient has been catheterised recently and it is likely that his prepuce was not replaced following insertion of the urethral catheter.
- On examination you find his foreskin to be markedly oedematous with an obvious tight band of foreskin just below the glans penis (see Figure 1).



**Figure 1**



#### Case 2:

You are working in A&E as a FY2 and are asked to see a 17 years old patient with distal penile pain and swelling which he noticed this afternoon while having a shower.

#### What are the important factors to determine in this patients history?

- The important issue is whether this patient is sexually active. A first sexual encounter with the patient inadvertently neglecting to replace the foreskin is a common scenario.
- On examination you find a swollen foreskin retracted behind the glans penis (see Figure 2).



**Figure 2**

#### What is your diagnosis?

The diagnosis in both cases is that of a paraphimosis which occurs when the foreskin, which is usually tighter than normal, is retracted behind the glans penis and not replaced. Subsequently venous congestion occurs with secondary preputial oedema such that as time progresses, the prepuce is increasingly unlikely to return to its usual position. With further delay, arterial insufficiency may occur leading to ulceration or ischaemic necrosis in rare cases.

## ACUTE PENOSCROTAL EMERGENCIES

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### How do you manage this patient?

- Haematological investigations are unnecessary in such patients unless there are relevant comorbidities e.g., renal failure, and the patient requires surgical intervention with general anaesthesia.
- Manual reduction is possible in early presentation with topical anaesthesia provided by either topical lidocaine containing gel, (Instillagel) or a penile nerve block.
- To achieve manual reduction, the oedema within the glans penis must be dispersed to allow the foreskin to be replaced. This is most effectively achieved by applying even pressure to the whole of the glans penis with the pulps of all five digits on your dominant hand whilst stabilising the penis and applying gentle traction to the foreskin with the other hand. With patience and persistence, the vast majority of paraphimoses can be resolved with this method.
- Ice wrapped in a rubber glove can be applied around the glans penis to reduce the swelling which may aid in reduction of the foreskin

On rare occasions this method may fail, in which case senior review is required to determine whether the patient should undergo an emergency dorsal slit of the foreskin or a formal circumcision under appropriate anaesthesia. Typically is a dorsal slit is performed, elective circumcision at a later date will be required.

### Case 3:

A 54 years old man presents with a painful erection of over 6 hrs duration. He previously attended the andrology clinic with erectile dysfunction this morning, where he was given an intracavernosal injection of prostaglandin to induce a chemical erection.

On examination his penis is fully erect and painful (see Figure 3).



Figure 3

## Acute Penoscrotal Emergencies. Patient Management.

### What is the diagnosis?

#### The diagnosis is Priapism.

A priapism is a prolonged erection in the absence of sexual stimulation and lasting for longer than 4 hrs. Whilst usually associated with pain secondary to ischaemia, (low flow priapism) priapism as a result of trauma is usually secondary to abnormal arteriovenous communication and as such is not subject to anoxia and is therefore painless, (high flow priapism) a

#### How is Priapism classified?

High Flow	Low Flow
Non ischaemic	Ischaemic
Elective	Emergency
Painless	Painful
Semi-erect	Fully rigid
Respond to stimuli	No response to stimuli

### What investigations are required for this patient?

The aim is to distinguish between a high flow and low flow priapism. Low flow priapisms are associated with venous congestion and arterial insufficiency resulting in hypoxia and subsequent ischaemia. It is therefore a urological emergency with a limited time frame before irreversible hypoxic damage occurs. In contrast, a high flow priapism is not an acute emergency as the corpora cavernosa remain retain their oxygen input.

(a) Corporal Blood Gas: This will allow you to distinguish between a low or high flow situations. A green butterfly (?? gauge) is inserted directly into the lateral aspect of the shaft of the penis and 10mls of blood is withdrawn. The butterfly is left in for further management. The blood removed will be dark if de-oxygenated, (indicating a low flow situation) or bright red if oxygenated, (indicating a high flow situation).

(b) Colour Doppler: This will reveal the presence or otherwise of blood flowing into the corpora cavernosa.

## ACUTE PENOSCROTAL EMERGENCIES

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### How would you manage this patient?

- The patient should be advised to perform simple exercise in an attempt to reduce the erection. Getting the patient to climb up and down the stairs will often help as will doing push ups.
- If this fails, blood should be aspirated from the corpora as described above. Initially 50mls should be drawn. If this fails to resolve the issue, a further 50mls should be removed and the corpora infused with heparin saline.
- If the erection persists despite this, 200mcg of phenylephrine should be infused with the patient connected to a cardiac monitor. This can be repeated if there is no response and a further 500mcg may be administered if the erection fails to resolve.
- In the event that these measures fail, surgery is required and the patient should remain starved.

### Case 4:

A 26 years old male patient presented to the accident and emergency with a bruised and swollen penis. During penetrative sexual intercourse he heard a snap which was followed by pain and immediate loss of erection.

On examination you find his penis to be swollen and bruised in the flaccid state, (Figure 3).



**Figure 4**

### What is your diagnosis

- The diagnosis here is a fractured penis, which occurs due to rupture of one or both corporal cylinders as a consequence of forceful contact between the erect penis and the pubic arch during vigorous sexual intercourse.
- An audible snap followed by pain and an immediate loss of erection are hall mark features of this condition. The penis is typically swollen and engorged resembling an aubergine.
- The presence of blood at the external urethral meatus should alert you to the possibility of an associated urethral injury which occurs in 15-20% of cases. This being the case, there will be less swelling and bruising since some of the blood escapes via the urethra.

### What investigations does this patient require?

Penile ultrasonography can localise the corporal tear to enable focussed surgery but unless this is available immediately, no investigations are required other than those dictated by the patient co-morbidity.

### How to you manage this patient?

This patient requires immediate penile exploration and a cysto-urethroscopy if you suspect urethral injury. Administer analgesia and keep the patient starved pending review by senior urological cover.

### Case 5:

You are asked to see a 34 years old man who was bitten by his neighbour's dog. He is otherwise fit and well.



**Figure 5:**

### What is your diagnosis?

(a) This patient has suffered superficial scrotal trauma with extensive lacerations as a consequence. Such trauma may arise from a multitude of mechanisms, (Table 2).

Self inflicted
Psychiatric history
Accidental
Frenular tear
Dog bites
De-gloving
Criminal
Stabbing
Shooting
Bobbitizing

## ACUTE PENOSCROTAL EMERGENCIES

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### What investigations do you need?

The patient does not require any further investigations unless dictated by other co-morbidities e.g., diabetes.

### How would you manage this patient?

This should be considered a dirty wound and managed as such. The patient tetanus status should be determined and a further booster given if required. The wound needs cleaning and may require debridement of tissue edges to excise non viable tissue and aid primary closure. This is best done under a general anaesthesia and so the patient should be kept nil by mouth and senior advice sought. Whilst waiting for a theatre, warm wet sterile gauze should be used to cover the wound.

Antibiotics should be given in this instance. Flucloxacillin at 500mgs qds should be commenced provided there is no history of allergy to penicillin based antibiotics.

### Case 6:

You are asked to see a 70 years old male patient with scrotal pain and swelling. He has diabetes and was admitted a couple of weeks earlier with renal failure and high blood glucose levels. He was catheterised sat this stage for monitoring.

On examination his scrotum is swollen and erythematous with an obvious area of necrosis on the underside, (Figure 5). He is tachycardic and hypotensive with a temperature of 38.5 0C and there is a distinctive malodorous smell.



Figure 6:

## Acute Penoscrotal Emergencies. Patient Management.

### What is the diagnosis?

This is classical Fournier's gangrene in a high risk patient with renal failure, diabetes and urethral catheterisation. Fournier's Gangrene is also known as necrotizing fasciitis and is caused by aerobic and anaerobic bacteria which grow in a synergetic fashion resulting in end arteritis obliterans.

Predisposing factors
Elderly man
Unkempt
Alcoholic
Self neglect
Immunosuppression
Diabetes
HIV
Systemic Disease
Possible trauma

Table 3 : Risk factors for the development of Fourniers Gangrene

Predisposing factors
Elderly man
Clinical signs
Erythema
Necrosis
Tenderness
Crepitus
Malodour
Systemic upset

Table 4 : Clinical features of Fourniers gangrene

**ACUTE PENOSCROTAL EMERGENCIES**

Bharat Vissamsetti and Ian Pearce

**What investigations are required?**

FBC, U&E's, coagulation factors and serum glucose are all required in preparation for surgery. In view of systemic sepsis, blood cultures, wound swabs and urine cultures should be taken. Arterial blood gases should be taken, if possible as these patients are usually profoundly acidotic.

**How do you manage this patient?**

The patient should be resuscitated according to the ABC protocol and supported with oxygen, intravenous fluids and appropriate antibiotics as dictated by microbiological advice. Multidisciplinary management is essential for the successful outcome of patients with Fourniers gangrene. Senior help should be sought immediately and general surgical input may be required, if the gangrene is extensive. This is usually only apparent at the time of surgery so alerting the on call general surgical team is essential as the patient may require a de-functioning colostomy.

Post operatively the patient will need HDU support at least so HDU/ITU should be involved from an early stage.

Extensive radical debridement is the only option and involves wide excision of all but clearly viable tissue, (Figure 6). The wound is then covered with betadine soaked swabs with a view to repeat inspection and further debridement at 24 hours. Following this plastic surgery input will be required to achieve skin covering in the long term.

Photos courtesy of Manchester Royal Infirmary Dept of Urology



**Figure 6:**



### Acute Penoscrotal Emergencies. Patient Management.

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## CASE-BASED DISCUSSION – INTERSTITIAL CYSTITIS & KETAMINE INDUCED VESICOPATHY

Niyukta Thakare and Ian Pearce



### Case-Based Discussion – Interstitial Cystitis- & Ketamine-Induced Vesicopathy. Patient Management.

#### Abstract

Interstitial Cystitis (IC) is a chronic distressing bladder condition, which is difficult to diagnose and hence manage. We describe the case of a 30 years old lady presenting with symptoms of suprapubic pain associated with bladder filling and discuss the management and treatment options.

#### Case History

A 30 years old lady is referred by the GP to outpatient urology clinic. Her presenting symptoms include suprapubic pain, frequency, urgency and nocturia. This has been ongoing for more than 12 months and is causing considerable distress to the patient.

#### 1. What aspects of this patient history are important?

- Age: Typically IC is a disease of adult life with only rare presentation prior to this. Such symptoms in younger patients are usually indicative of Urinary Tract Infection (UTI).
- Gender: IC, in common with UTI, is more frequently found in females (10:1) and has predominance for Caucasians.
- Symptom Duration: Short lived symptoms are again indicative of UTI. IC, by definition is a chronic condition of usually more than 6 months duration. According to the US NIDDK workshop research definition, duration of symptoms for less than 12 months is an exclusion criterion<sup>1</sup>.
- Symptoms: The hallmark symptom of IC is that of pain experienced in the suprapubic region, which worsens on bladder filling and is alleviated on bladder emptying. The pain may also radiate to the urethra, vagina or perineum.
- Associated Symptoms: Commonly the patient experiences urinary urgency, frequency and nocturia. Urgency is an intense desire to void which may be aggravated due to pain and discomfort. Frequency is often more than 10 times a day and nocturia is almost always present.

#### 2. What are the differential Diagnoses?

- UTI
- IC
- STI
- Urinary stone disease
- Endometriosis
- TB
- Previous pelvic radiation
- Bladder malignancy

#### 3. What aspects of the patient past medical history are relevant?

- IC is known to be associated with the following diseases:
- Inflammatory bowel disease and irritable bowel syndrome,
  - Systemic lupus erythematosus,
  - Vulvodynia, Fibromyalgia,
  - Chronic fatigue syndrome,
  - Migraines,
  - Asthma,
  - Panic disorders and abuse.

#### 4. What might you expect to find on clinical examination?

- A thorough physical examination should be performed to include the following:
- Abdominal examination to assess for bladder fullness and tenderness. An abdominal mass should be excluded.
  - Genital Examination should include vaginal and bimanual examination in females and scrotal and digital rectal examination in males.

#### 5. What investigations would you perform?

- Urine dipstick can be performed in clinic and Mid-stream Sample of Urine instead of Urine (MSSU) should be sent for microscopy, culture and sensitivity.
- If sterile pyuria is detected, urine should be cultured for Acid Fast Bacilli rule out TB.
- Urine cytology to exclude malignancy.
- If STIs are suspected, vaginal or urethral swabs should be sent.
- USS to assess post voids residual volume.
- FBC to determine WCC, which will be raised in the presence of UTI.
- U & E to obtain crude indication of renal function



## CASE-BASED DISCUSSION – INTERSTITIAL CYSTITIS & KETAMINE INDUCED VESICOPATHY

Niyukta Thakare and Ian Pearce



### 6. What further evaluation does this patient require?

- A voiding diary for 3 consecutive 24 hours periods will enable accurate and reproducible determination of 24 hours urinary frequency and will facilitate correlation between this and fluid intake. Associated pain and any incontinence experienced are also recorded.
- Urodynamic Studies: Involuntary contractions are diagnostic of detrusor overactivity whereas reduced bladder compliance is a feature of interstitial cystitis. It is important during this test to try and replicate the patients symptoms as closely as possible.
- Cystoscopy: It is performed under general anaesthesia along with hydrodistension. Pathognomic features are development of glomerulations and Hunner's ulcers on distension. Classification of lesions includes:
  - Grade 0 ¼ normal mucosa.
  - Grade I ¼ petechiae in at least two quadrants.
  - Grade II ¼ large submucosal bleeding (ecchymosis).
  - Grade III ¼ diffuse global mucosal bleeding.
  - Grade IV ¼ mucosal disruption, with or without bleeding/oedema.
- Bladder Biopsy: Biopsies should be taken from abnormal areas and/or three areas including the dome and two lateral walls. The pathology report includes features of epithelial dysplasia, inflammation in the lamina propria, abnormal muscle, intrafascicular fibrosis and mast cell count. It also excludes enables the exclusion of other conditions such as carcinoma in situ and tuberculous cystitis.

### How might this patient care be directed?

- There is no known cure for IC and this is an important fact which should be discussed with the patient to ensure realistic expectations.
- Treatment is aimed at palliation rather than cure and the reduction of pain is the first and key priority. Prevention of symptomatic flares and delaying disease progression are also important.
- An important point to remember is that IC is a variable disease and one which different patients react to in different ways. It is vital that management is tailored to the individual patient and that the patient is involved in the decision making progress.

### Treatment Modalities:

#### Non-Pharmacological

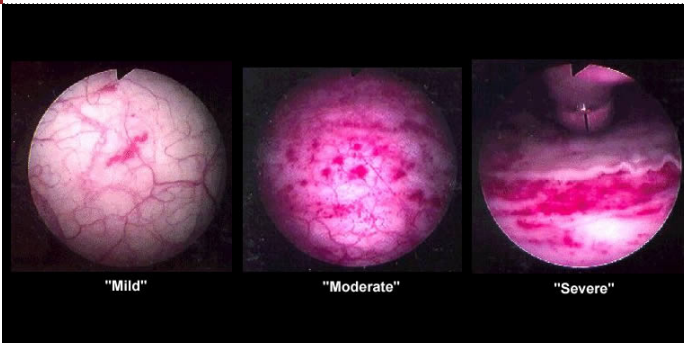
- Psychological Support and Behavioural Therapy: This includes patient education and self help groups, cognitive therapy and hypnosis. Bladder training has shown to improve symptoms in some studies. Patients should be advised to stop smoking.
- Diet: Although there is limited scientific data to prove that dietary modification produces symptom alleviation, many patients report symptomatic improvement from avoiding various dietary products including caffeine, Citrus fruit juice and spicy foods. Patients can be advised to avoid individual food triggers by using the IC-Network Patient Handbook.
- Physical Therapy: including general exercise, pelvic floor exercises, intra-vaginal electric stimulation, acupuncture and hyperbaric oxygen have brought benefit to some, but not all patients.

#### Pharmacological (oral)

- Analgesia: Advocated for pain control, opioids are preferred for short term pain relief. Long term use of opioids is discouraged in view of chronic nature of the condition.
- Hydroxyzine: It is a histamine H1 receptor antagonist which stabilises and prevents mast cell de-granulation and inhibits serotonin secretion. The starting dose is usually 25mg nocte which can be increased to up to 75mg/day, if required. Side effects include drowsiness, constipation, dry mouth and weakness. Although 90% of patients showed improvement of symptoms in one series, a positive RCT is lacking.
- Pentosanpolysulphate Sodium, Elmiron (PPS): PPS is a Glycosamino Glyceran, (GAG) layer replacement agent, which substitutes the GAG layer, defects in the urothelium of patients with IC. Response to treatment has shown to be 45–50% with no impact on nocturia. Doses of between 100–200mg three times a day, depending upon response, although therapeutic duration appears to be more important than dose.
- Amytriptiline: A tri-cyclic antidepressant and anxiolytic with a multi-factorial mode of action including acetylcholine, (ACH) receptor blockade, inhibition of serotonin and norepinephrine re-uptake, and blockade of H1 receptors. Given in doses of 25–100mg at night, responses of about 45–65% may be seen.
- Cyclosporin A: An immunosuppressant which inhibits transduction and is an IL-2 and T-cell antagonist. It has shown to have better results than PPS with a 75–80% response rate and significant pain reduction. The usual dose is 1.5mg/kg bd and side effect includes hypertension, hirsutism, gingival hyperplasia, parasthesia and muscle pain.
- Antibiotics: In the absence of proven concurrent UTI, antibiotic therapy is not indicated.

## CASE-BASED DISCUSSION – INTERSTITIAL CYSTITIS & KETAMINE INDUCED VESICOPATHY

Niyukta Thakare and Ian Pearce



### Case-Based Discussion – Interstitial Cystitis & Ketamine Induced Vesicopathy. Patient Management.

#### Pharmacological (Intravesical)

- Local Anaesthetics: Alkalinised 2% lidocaine when used as an intravesical agent has shown a response rate of 94% sustained at 80% after 2 weeks.
- PPS can be instilled intravesically in a dose of 300mgs in 50mls of normal saline. A single RCT with 20 patients showed a response of 40% at 3 months and 80% at 18 months.
- Heparin: 10,000units in 10mls of normal saline three times a week has shown a response of 50–80%.
- Hyaluronic Acid: A GAG replacement agent has short term benefit with reduced pain and frequency and response rate of 55–70%.
- Chondroitin Sulphate has shown to be beneficial in patients with positive potassium chloride test in a dose of 40mls instilled weekly with good response in 45% and some response in 90% patients.
- Dimethyl Sulphoxide (DMSO) is a water soluble chemical solvent with analgesic, anti-inflammatory and muscle-relaxant effects. It is an intracellular OH radical scavenger with subjective results in 50–55% and objective results in 90–95% patients.

Pharmacological agents including cimetidine, prostaglandins, L-Arginine, anti-cholinergics, duloxetine and clorpactin have shown limited efficacy and are not recommended. There is conflicting data regarding the use of intravesical BCG and Resiniferatoxin (RTX).

#### Surgical Management

Patient selection is important and surgical options should be considered in end stage, treatment refractory cases with significant reduction in quality of life. Patients should be psychologically able to consent and have realistic expectations regarding the outcome of such major surgery.

##### Surgical options includes:

- Hydrodistension,
- Transurethral Resection (TUR) of ulcer, coagulation and LASER,
- Botulinum Toxin,
- Radical Cystectomy,
- Trigone sparing surgery,
- Sub-trigonal cystectomy.

#### Discussion

There is considerable difficulty and confusion in diagnosing and treating interstitial cystitis. Interstitial cystitis is a bladder disorder with chronic inflammation as one of the features and is included in the spectrum of Painful Bladder Syndrome (PBS) and Bladder Pain Syndrome (BPS).

*The NIDDK published criteria in 1988 included in the NIDDK workshop research definition of interstitial cystitis<sup>1</sup>.*

**European Society for Study of IC/PBS (ESSIC) classification<sup>3</sup> is based on cystoscopy with hydrodistension and bladder biopsies and is as follows:**

		Cystoscopy with Hydrodistension			
		Not done	Normal	Glomerulations <sup>a</sup>	Hunner's Lesions <sup>b</sup>
Biopsy	Not done	XX	1X	2X	3X
	Normal	XA	1A	2A	3A
	Inconclusive	XB	1B	2B	3B
	Positive <sup>c</sup>	XC	1C	2C	3C

- Cystoscopy: glomerulations grade <sup>2-3</sup>.
- With or without glomerulations.
- Histology showing inflammatory infiltrates and/or detrusor mastocytosis and/or granulation tissue and/or intrafascicular fibrosis.

The exact pathogenesis of IC is unknown although hypotheses include infection, mast cell activation, defects in the urothelial GAG layer, autoimmune mechanisms and hypoxia.

Multi-modal and 'cocktail therapy' forms the mainstay of treatment. Future therapies include Gabapentin (anti-epileptic), Pre-gabalin (Alpha[K3] – 2 – Delta ligand that binds and modulates voltage gated calcium channels), Suplatast sofilate (immunoregulator suppressing T-cell mediated allergies), Quercetin (bioflavonoid) and Recombinant human nerve growth factor.

## CASE-BASED DISCUSSION – INTERSTITIAL CYSTITIS & KETAMINE INDUCED VESICOPATHY

Niyukta Thakare and Ian Pearce

### Ketamine Induced Vesicopathy

The use of ketamine as a recreational drug is on the rise. A short acting anaesthetic agent, its ability to make the body feel numb and cut-off from the surroundings makes it popular amongst young people. The harmful effects of ketamine on the bladder are now well-known and the condition is termed as Ketamine Induced Vesicopathy (KIV).

Patients present with severe lower urinary tract symptoms in the form of urgency, frequency and dysuria in the absence of urinary tract infection. In addition a history of visible or frank haematuria and urge incontinence is frequently present. Age at presentation is typically 16–35 years and usually there is no predominance in either sex. Duration of symptoms can be a few days to a few years with the symptoms being more severe with chronic use. A good history is of vital importance since patients do not always admit the use of recreational substances.

Urinalysis to rule out UTI as a cause and renal function tests to assess the upper tracts can both be carried out at the time of presentation. Further assessment with a voiding diary, urodynamic studies to evaluate bladder capacity and cystoscopy to look for other causes of haematuria are necessary. In the presence of abnormal renal function, an ultrasound scan of the renal tract might demonstrate hydronephrosis due to back pressure on the kidneys because of poor bladder compliance.

Treatment strategies similar to those of IC have been employed, although there is only limited evidence for any of them. Anti-substance abuse therapy and complete cessation of the drug is crucial to prevent progression and can lead to improvement in symptoms. Other type of treatment includes:

- NSAIDs, Anti-cholinergics and Steroids.
- Cystodistension.
- Insertion of nephrostomy for hydronephrosis and deranged renal function.
- Intravesical hyaluronic acid and PPS.
- Urinary diversion and bladder augmentation as a last resort for refractory symptoms and renal deterioration.

One should bear in mind that ketamine cystitis can also present as an emergency with intense suprapubic pain and haematuria in a young patient. Instituting an history of abuse is the key to diagnosing and treating this damaging disorder.



### Question

Choose the single best answer to the following MCQs:

#### 1) Features of Interstitial cystitis include all except:

- a. Supra-pubic pain
- b. Urinary frequency
- c. Nocturia
- d. Poor flow
- e. Low bladder compliance

#### 2) Which of the following conditions is not known to be associated with IC?

- a. SLE
- b. Irritable bowel syndrome
- c. Diabetes
- d. Asthma
- e. Fibromyalgia

#### 3) Which of the following oral pharmacological agents has highest efficacy in treating IC?

- a. Opioids
- b. PPS
- c. Amitriptyline
- d. Antibiotics
- e. Cyclosporin A

### Answers

#### 1) d.

Poor flow is a feature of bladder outlet obstruction. All others are features of IC. Bladder compliance is reduced in patients with interstitial cystitis.

#### 2) c.

Diabetes not known to be associated with interstitial cystitis whereas SLE, Irritable bowel syndrome, Asthma and fibromyalgia are all associated with IC.

#### 3) e.

Cyclosporin A has the highest response rate, better than PPS and amitriptyline. Both opioid analgesics and antibiotics have limited role.

## CASE-BASED DISCUSSION – INTERSTITIAL CYSTITIS & KETAMINE INDUCED VESICOPATHY

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### Case-Based Discussion – Interstitial Cystitis & Ketamine Induced Vesicopathy. Patient Management.

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## CATHETERISATION

Stephen Bromage



### Catheterisation. Patient Management.

#### Abstract

Urethral catheterisation is often perceived as a simple procedure that requires little training. However, although catheterisation is usually performed without complication, there are instances, where it causes significant problems such as sepsis or urethral trauma. As catheterisation is commonly performed these instances are more prevalent than most non-urologists appreciate. This case covers the indications for catheterisation, types of catheters and the pit-falls and complications that can arise and how to deal with these. Basic catheterisation technique will also be covered in order to help junior doctors perform the procedure safely and effectively and recognise when things have gone wrong! Finally 3 specialised situations are discussed that may be encountered by on-call junior doctors; suprapubic catheters, 3-way catheters and irrigation, and self catheterisation.

#### Case Scenario

You are called to a medical ward to catheterise a patient who is in retention. They have not passed urine for 16 hours. What would you do?



Figure 1 (patient)

#### Assess the Patient

The first thing to establish is whether this is actually retention or not. Many patients are catheterised with possible retention of urine, which are either dehydrated, or have a urinary tract infection with frequency, urgency, the feeling of incomplete emptying, but no significant residual. Occasionally, there may be a supravescical obstruction to urine, i.e., at the level of the ureters, so a patient will not have a urine output, may have an empty bladder and yet may be fluid overloaded.

Therefore, the assessment should take the form of history, examination, and chart review.

#### History

##### The history should determine:

- the reason for hospital admission,
- the nature of the patients voiding symptoms and duration,
- the last time the patient passed urine,
- whether they are in pain,
- any previous urologic al history, and
- any precipitating factors for retention; recent pelvic surgery, recent anaesthetic, constipation, urinary tract infection, change in medications.

#### Examination

**It is now important to determine whether the patient is really in retention of urine. Therefore:**

- Examine the abdomen: is there a palpable bladder.
- If possible a bladder scanner can give a good estimation of bladder volume, but beware of the inaccuracy of these tools as occasionally other structures can mimic a bladder, such as large cysts or haematomas.
- Assess the patient's hydration by skin turgor, JVP, and oedema. This will help to determine whether the patient is dehydrated or fluid overloaded.

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#### Chart Review

General observations can be assessed, which may help reveal signs of dehydration, fluid overload or sepsis. It is important to review when the patient last passed urine, the volumes passed and the overall fluid balance, both input and output.

**Now that the assessment has been completed there are 3 common scenarios that you may encounter:**

1. The patient has painful retention of urine (i.e., Acute retention of urine). This is the easiest scenario to manage in most cases as the treatment decision is uncomplicated- they need a catheter!
2. The patient is anuric. This should be approached by considering the possible causes as in renal failure; i.e., a pre-renal, renal or post-renal problem. Your assessment will lead you to the likely cause which is most commonly pre-renal. Treatment will then be dictated by the underlying cause. A catheter may still be appropriate if urine output monitoring is required. A full set of bloods including haemoglobin and electrolytes and renal function will be required.
3. The patient has a palpable bladder but no pain (i.e., chronic retention of urine) and otherwise well. This is often an area of confusion as there are many people who have chronic retention of urine in the community and suffer no consequences from this. They will often void leaving behind a residual that can be over 500ml. If the patient is comfortable and stable these patients can be given more time to see if they pass urine, but will need review. They may even benefit from a fluid challenge (oral or IV). It is important to check renal function electively to ensure there is low pressure in this residual and that there is no detrimental effect on the kidneys. An ultrasound scan to look for hydronephrosis will help to determine any renal obstruction. Commonly these patients are catheterised based on a residual alone rather than the clinical picture, which can introduce unnecessary discomfort and potential complications.

#### Case Study

This patient has a palpable bladder and is in pain, indicating an acute retention and a decision to catheterise is made.

#### Catheterisation

Once a decision has been made to catheterise then the next step is to select the correct catheter. There are many types of catheters and many wards will only stock one type, and sometimes one size! However, a little knowledge of catheter types and sizes can be very useful.

#### Types of Catheters

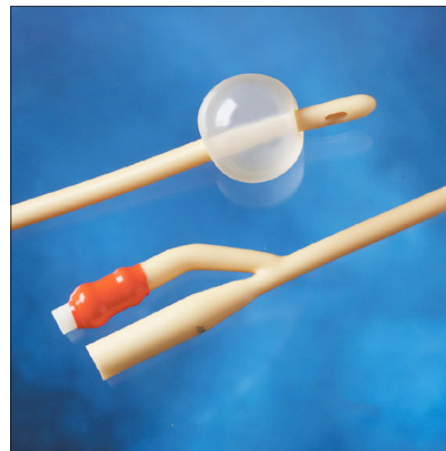


Figure 2 (2 way catheter)

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- The size of a catheter is measured using the CharriDr French scale. 1mm diameter is equivalent to 3 French. The diameter of a ten French catheter is 3.3mm and the circumference is roughly 10mm. Therefore the French can be used to give us the circumference of our catheters in mm.
- A Foley catheter is simply a single use urethral catheter with a retention balloon (see figure 2).
- There are male and female urethral catheters, the female catheters being shorter, but the female catheters are clearly labelled now and in some hospitals no longer stocked to avoid the complications associated with catheterising a male with a short female catheter. It is important to know that these exist to avoid a urethral injury.
- Catheters are made from 3 main materials; latex, silicone and PVC. In general, PVCs are very short term 1 week, latex 4-6 weeks and silicone 12 weeks (long term). Catheters may be coated by another hydrophilic coating, e.g., hydrogel, prolonging the catheter lifespan. The constituents of the catheter and its life expectancy are found on the packaging.

## Summary of catheter composition and coating:

**Composition**

1. Latex Catheter – Softer catheters, these usually last for 4-6 weeks
2. Silicone – often more rigid and easier to insert. These usually last 12 weeks.
3. PVC – are more rigid and may be seen in some patients post urological procedures, such as TURP. These catheters can last for up to 1 week. Most in/out catheters are also made of PVC

**Coating**

1. Hydrogel: Coating – absorbs 800% its own volume of fluid forming a hydrophilic cushion and decreasing the friction with the mucosa
2. Silicone – decreased bacterial adherence
3. PTFE (Teflon) – Decreases friction and bacterial adherence
4. Silver Coating – decreasing bacterial adherence by 25-99% and causing bacterial damage following adherence.
5. Antiseptic/antibiotic impregnated catheters (e.g., Minocyclin and Rifampicin).

## Too much choice!!! How to choose?

Well, often a non-urology ward will not stock all the above choices. Most adult patients will require at least a size 12 Fr and usually up to 18 Fr unless a 3-way catheter is required. The choice is always a balance between comfort and reducing the risk of blockage. A 16 Fr flexible catheter is usually a safe and comfortable choice. A fine catheter can also become coiled up in a large prostate on insertion. Silicone catheters tend to be more rigid and may be better at negotiating occlusive prostates. A coude tip is a angled tip catheter to help negotiate through a large prostate or a high bladder neck (see Figure 3).

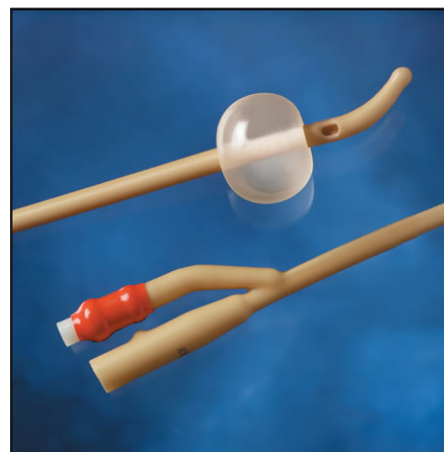


Figure 3 (coude catheter)

## How to perform male urethral catheterisation?

- Ensure there is a sound indication.
- Explain the indication and the procedure to the patient and obtain verbal consent.
- Ask about allergies (namely latex).
- Set up catheter trolley including all necessary components as per aseptic technique.
- Clean hands and prepare trolley using aseptic technique.
- Expose the patient (ensure dignity of the patient as much as possible).
- Clean hands again and put on sterile gloves.
- Clean patient area (sterile saline is acceptable) and use paper drape to surround genitals.

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- Hold the penis straight in an erect position using a gauze swab and introduce the Instillagel (anaesthetic, lidocaine lubricant gel) slowly into the urethra, giving the gel 3–5 minutes to work.
- Insert the catheter whilst holding the penis straight and until urine begins to come through the catheter.
- Advance the catheter a further 5cm to ensure it sits within the bladder.
- Take a specimen of urine.
- Inflate the balloon with sterile water (the amount the balloon will take will be written on the channel for the balloon. If there is pain or resistance STOP.
- The catheter may be pulled gently back so the balloon sits at the bladder neck.
- Attach the drainage bag.
- Replace the foreskin.
- Clean up after the procedure and wash hands.
- Document the procedure in the notes including the size of the catheter, the volume in the balloon, the colour of urine drained and the residual volume.

### Complications of Catheterisation

#### Case Study:

The catheter cannot be inserted fully as it will not go in more than about 20cm.

#### What would you do next?

If a single attempt with the correct catheter fails then senior help should be sought. Catheterisation is a blind procedure and false passages can easily be created during multiple failed attempts. A coude tip catheter is often a good second choice of catheter, but urological support should be sought if this fails.

#### Case Study:

A 14 French catheter is inserted that goes in most of the way. A small amount of blood drains through the catheter giving the appearance of possible haematuria. The balloon is inflated. Later the patient develops more suprapubic pain and the catheter is only draining small amounts of blood.

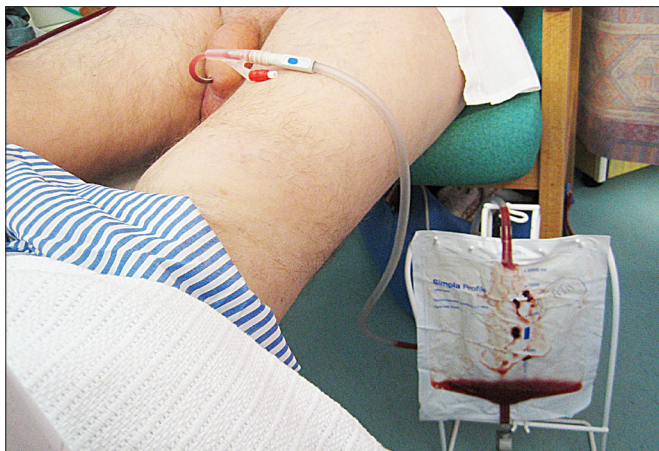


Figure 4 (patient with haematuria)



### How would you approach this?

Again assessment of the patient as above is keys and can be performed relatively quickly. However, it is important to establish is whether the catheter is in the bladder or is blocked. This can be done through examination of the patient to confirm retention of urine and attempting to feel the balloon, which may be palpated in the urethra if it is not inside the bladder. The length of catheter outside the patient may also elude to this and remember that there are both male and female catheters! A 50ml bladder syringe may be used to flush the catheter. If it is blocked this may unblock the catheter and improve the flow. In a relatively empty bladder it is useful to flush through 100ml at least before aspirating as the bladder can collapse down on the catheter with the suction applied via the syringe. If flushing causes severe pain it is probably not in the correct place and should be replaced. If there is significant bleeding on removal or the catheter is difficult to replace then a urological opinion should be required.

There are 3 common catheters that are encountered by junior doctors unfamiliar with urology that are deemed complicated because of unfamiliarity; suprapubic, 3-way and in/out catheters used for self-catheterisation.

### Suprapubic Catheters

These should be initially placed by urologists either with cystoscopic guidance or with the aid of ultrasound to reduce the injury to surrounding structures, particularly bowel. However, once in place a junior doctor is often called as the suprapubic catheter has either fallen out or blocked. It is important NOT to be afraid of these catheters. An established tract is formed after the catheter has been in place even just a week. However, if a catheter comes out of this tract it can close over quickly even if the catheter has been in place for many years. Therefore replace it as quickly as possible. This is done exactly the same way as a urethral catheter. The distance to traverse until urine drains will be less and once urine does drain the balloon should be inflated. Putting too much catheter in the bladder can on occasions lead to the tip coming through the urethra!



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## 3-way Catheters and Irrigations

These catheters have an extra port for irrigation as opposed to the standard 2-way catheters. The central port should be connected to a catheter bag, as it is the best for drainage. The irrigation port may be used for washouts, irrigation or can be blocked with a spigot. Insertion is no different from the technique above although additional instillage may make the procedure more comfortable for the patient and doctor! If a patient with haematuria is having problems with recurrent blockages through a 2-way catheter, then inserting a 3-way catheter and performing a good bladder washout can swiftly correct the problem.



Figure 5 (3 way catheter)

## Self-catheterisation

Many patients self catheterise in the community, most commonly due to a poorly contracting bladder. Patients will normally self catheterise 3 or 4 times a day with a single use catheter. These catheters are usually lubricated by the fluid included in the packaging. They can be useful in draining a patient's bladder that has developed retention of urine following a general anaesthetic, with the hope that they will be able to void by the next time the bladder fills. They can also be useful in dilating a suprapubic tract or urethra as the sizes range in French just the same as standard urethral catheters do, yet they are more rigid and easier to insert. There is of course no means of retaining these catheters in the bladder such as a balloon



Figure 6 (intermittent catheter)

## Test Yourself

Choose the correct answer from the following questions:

**1. An indication for catheterisation is:**

- A post voids residual volume of 500ml with no pain.
- No urine output for 12 hours.
- Visible haematuria with no clots.
- Suprapubic pain and a palpable bladder.
- Urinary frequency every 30 minutes.

**Answer (d).**

Patients in low pressure chronic retention of urine (i.e., no renal obstruction) do not necessarily need to be catheterised, but should have urology follow up or review. A patient with no urine output may be anuric rather than in retention of urine. Visible haematuria with no clots can often be assessed in the outpatient setting unless there are more worrying signs. Urinary frequency or incontinence may be related to urological disorders such as infection and does not necessarily need catheterisation. An acute retention of urine is associated with pain and almost always needs catheterisation.

**2. A suitable catheter for a patient with visible haematuria and lots of clots would be:**

- A 12 Fr 2-way PTFE urethral catheter.
- A 16Fr suprapubic catheter.
- A 22Fr 3-way silicone urethral catheter.
- A 16 Fr 2-way silicone urethral catheter.
- No catheter if voiding.

**Answer (c).**

If the patient is passing a lot of clots it implies that there is either a substantial sized clot in the bladder or there is significant ongoing bleeding. Therefore, a catheter is indicated to wash out this clot. A 3 way catheter allows for irrigation and washouts through a large lumen and would be the most appropriate choice.

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## EPIDIDYMITIS

Rono Mukherjee and Andrew Sinclair



### Epididymitis. Case-Based Discussion.

#### Abstract

This Case-Based discussion focuses on a 32 years old gentleman presenting with epididymo-orchitis and discusses the assessment, differential diagnosis and treatment of the condition.

#### Case History

A 32 years old gentleman is referred with a 5 days history of a painful, tender and swollen testicle and also feels systemically unwell.

#### What is the likely cause of his testicular pain and what will you do next?

As in all patients a thorough assessment is needed to ensure a list of differential diagnoses can be correctly identified. From here the assessment should be tailored to exclude the more urgent and serious conditions before arriving at a diagnosis of epididymo-orchitis.

#### Background and Pathophysiology

Epididymitis is an inflammatory condition of the epididymis which can also involve the testis (epididymo-orchitis)<sup>1</sup>. This manifests itself clinically as acute hemi-scrotal pain and swelling usually secondary to bacterial infection, but may have non-infectious causes particularly in children (see Table 1). Alternatively, it may present as a chronic painful relapsing/remitting condition.

The majority of cases are of bacterial origin (gram negative coliforms particularly *E.coli*) arising from urinary bladder, prostate or urethra and then refluxing via the ejaculatory ducts and vasa deferens into the epididymis. The inflammatory response usually commences in the tail of the epididymis as it has the greatest blood supply, before spreading to the body, head and testis. Obvious risk factors include urinary tract infection (UTI), bacterial prostatitis, an underlying congenital abnormality (in children), instrumentation/catheterisation, and urinary stasis as a result of bladder outlet obstruction<sup>1</sup>.

In sexually active men particularly under the age of 35 years, sexually-transmitted diseases are the most common cause (46% if under 35, vs 7% if over 35) with *Chlamydia trachomatis* and *Neisseria gonorrhoea* the obvious pathogens<sup>2</sup>. Infection may have occurred months previously.

In addition, mumps orchitis is on the rise, as a result of the decline in vaccinations over the last few years<sup>3,4,5</sup>. Around 20–30% of infected post-pubertal males suffer from this complication as a result of haematogenous spread generally 4–11 days after the onset of parotitis<sup>5</sup>. The viral infection then spreads to the epididymis and in 10–30% bilateral orchitis occurs. Severe infection may result in testicular atrophy up to a year afterwards and infertility, if mumps orchitis is bilateral. Antibiotic therapy should be given as a bacterial cause may not be entirely ruled out or due to the risk of secondary bacterial infection (even with an obvious clinical diagnosis of mumps)<sup>4</sup>.

In susceptible risk groups, epididymo-orchitis may be the only focus of genitourinary TB, where it presents as a painless, slightly tender scrotal mass and, in some instances, abscess formation. The epididymis, vas and spermatic cord become “beaded” on palpation in chronic cases. Infection is thought to result from direct extension from the prostate and seminal vesicles but haematogenous spread may also occur.

Chronic epididymitis (symptoms more than 6 weeks) results in around 15% of acute episodes<sup>3</sup>. As with chronic cystitis or recurrent urinary tract infection, it may result from an inadequately treated initial infection (e.g., a persistent bladder or prostatic source) resulting in relapse/persistence of symptoms. Alternatively these may be the result of true de-novo recurrent infections usually due to an underlying risk factor.

<b>Acute Bacterial</b>	UTI inc STDs, TB, syphilis
<b>Acute Non-bacterial</b>	Viral, fungal, parasitic e.g. brucellosis, cryptococcus
<b>Acute Non-infectious</b>	Idiopathic Traumatic Autoimmune—granulomatous or sarcoid (rare) Amiodarone-induced (rare)
<b>Chronic</b>	

**Table 1: Classification of Epididymo-orchitis (adapted from Campbell-Walsh Urology, 9th Ed., Vol 1, Section IV, Ch 9, p328–329)**

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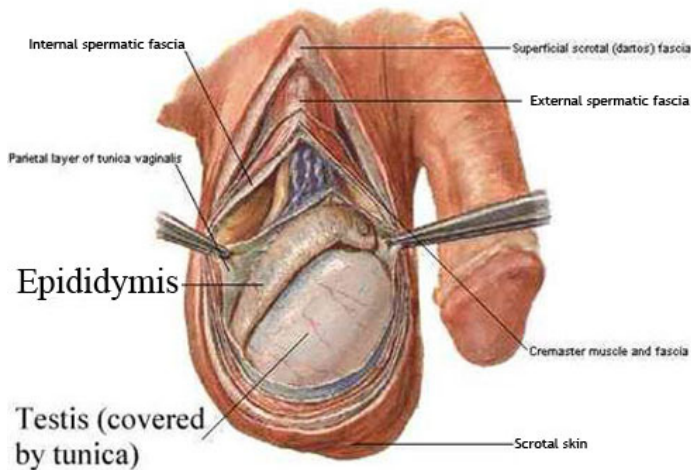


Fig 1

## Assessment

**When did the pain start?**

This is normally at least several days duration before presentation.

**What type of pain is it?**

A dull continuous ache and is tender to touch.

**Did it come on suddenly or gradually?**

Gradually

**Do you have any urinary symptoms?**

The testicular pain may have coincided with dysuria or urethral discharge.

**Is it on one or both sides?**

Classically one side only but can present with bilateral involvement. If the pain and tenderness is bilateral then mumps orchitis should also be considered.

**Have you had unprotected intercourse recently?**

A common cause of epididymo-orchitis in young men is sexually transmitted diseases.

**Have you ever had a sexually transmitted disease?**

This is often unknown or never been tested for.

**Is the tender area part of or separate from the testis?**

This is almost impossible for the patient to answer as they are often unaware of the difference and it is often too painful for the patient to self-examine.

**Other Medical condition?**

Does the patient have any co-morbidities that predispose to infection, for example diabetes? In older men, where the epididymo-orchitis may be secondary to urinary tract infection (UTI) risk factors for UTI also need to be established, for example bladder outflow obstruction.

## Differential Diagnosis

Patients present classically with acute pain and swelling with localising tenderness in the epididymis with or without involvement of the testis and spermatic cord (with pain radiating to the groin/lower abdomen). The swelling may eventually result in a global red hemi-scrotal mass with the testis indistinguishable from the epididymis. The overlying skin may become erythematous and a reactive hydrocoele may also result. Systemic symptoms, particularly a temperature, can occur. In addition patients may have co-existing or preceding symptoms of prostatitis, urethritis, or cystitis depending on the source of infection.

Although epididimitis should always be considered in the differential diagnoses for a patient presenting with acute scrotal pain, testicular torsion is essential to exclude particularly in the adolescent age group. Differential features are listed in Table 2, but it is important to bear in mind that torsion is the cause of 90% of cases of acute scrotal pain in patients between 13 and 21 years old<sup>6</sup>. Testicular torsion can also occur in older patients and therefore surgical exploration must be considered the ultimate investigative measure when any doubt exists.

Features	Epididymo-Orchitis	Torsion Testis
<b>Onset</b>	Gradual to rapidly progressive	Sudden
<b>Site</b>	Epididymis +/- testis/cord	Testis/cord
<b>Urinary Symptoms</b>	Often	Sometimes
<b>Pain</b>	Mild to severe	Severe
<b>Urinalysis</b>	Nit/Leuc/Blood	Normal
<b>Ultrasound Features</b>	Increased flow/hyperaemia	Non-diagnostic (may show impaired flow)
<b>Treatment</b>	Antibiotics	Surgical

**Table 2: Comparison of features between epididymo-orchitis and torsion of testis**

Testicular tumours may also present in a similar fashion particularly, if the Rete testis is involved (resulting in tubular obstruction and pain). In addition haemorrhage and superimposed infection may also result in pain and swelling precluding adequate palpation of the underlying testicular lesion. As a result, up to one-third of cases may be treated with antibiotics initially delaying referral and definitive management<sup>7</sup>. Other differentials include trauma to the testis with resulting haematocoele and possible breach of the tunica albuginea, (requiring ultrasonic assessment or surgical exploration, if any doubt).

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**Fig 2**

Fournier's gangrene (necrotising fasciitis of the scrotum and perineum) should also be borne in mind with regards to scrotal pain and swelling, particularly for at risk groups – patients with diabetes, immobilised with multiple medical co-morbidities. It presents with a classic triad of severe pain (out of proportion to the physical findings), swelling and fever. The infective process involves a subcutaneous synergistic infection with secondary cellulitis (non-blanching) and gangrene of the overlying skin with no involvement of the testis and epididymis. Prompt surgical debridement is required to prevent progression to septic shock, multi-organ failure and death<sup>8</sup>.

In addition referred pain from a ureteric stone can present in a similar fashion when no localising signs are present despite acute pain. Non-urological causes would include acute incarcerated inguino-scrotal hernia.

Chronic infective epididymitis may be difficult to differentiate from epididymyalgia/orchalgia in terms of clinical signs in a similar fashion to chronic prostatitis/pelvic pain syndrome. There may be an indurated, thickened or even hard epididymis, which may require ultrasonic follow-up to rule out a rare adenomatoid tumour<sup>9</sup>. Finally a history of previous vasectomy may implicate post-vasectomy discomfort/syndrome as a potential source of symptoms (present in 10–15% of patients following vasectomy)<sup>10</sup>. In all such cases, intermittent relapsing or almost constant symptoms may well have a considerable impact on quality of life.

### Investigations

**Baseline investigations for suspected epididymo-orchitis (with no suspicion of testicular torsion) include the following:**

- Urinalysis and MSSU,
- Gram Staining – urine/urethral smear - to look for intracellular gram-negative diplococci (N. gonorrhoea) or white cells (C. trachomatis in two-thirds) particularly, if urethral discharge present.
- Urethral swab for culture and sensitivity (prior micturition) or Urinary PCR for C. trachomatis and N. Gonorrhoea.
- Serum inflammatory marker if sepsis/monitor response as in-patient.
- Ultrasound with Doppler flow to confirm hyperaemic testicle/epididymitis. This should be used as an adjunct and not to exclude torsion as ultrasound is only 80% sensitive for diagnosing torsion<sup>11</sup>.

**Additional Investigations Includes:**

- IVU – if ureteric colic is suspected (e.g., normal clinical examination with testicular pain),
- Flowmetry and post-void residual (or formal Prostate/LUTS assessment clinic referral) in men over 50 years old.

### Treatment

Baseline management for acute epididymo-orchitis is summarised in Table 3.

Conservative	Bed Rest/Scrotal Elevation and Support
Analgesia	NSAIDs
Antibiotics <ul style="list-style-type: none"> <li>• Treat empirically until culture and sensitivities return to avoid progression / complications, as per local drug policies for regime.</li> </ul>	Over-35s (STD Unlikely) <ul style="list-style-type: none"> <li>• 10–14 days oral fluoroquinolone (allows for superior tissue penetration) or co-amoxiclav</li> <li>• intra-venous co-amoxiclav +/- gentamicin if in-patient for sepsis</li> </ul> Under-35s (STD more likely) <ul style="list-style-type: none"> <li>• doxycycline 100mg bd (or levofloxacin for more broad-spectrum cover) 14 days.</li> </ul>
Steroid therapy <ul style="list-style-type: none"> <li>• Recommended in European Association of Urology Guidelines<sup>3</sup> in young men to reduce infertility risk, but not currently standard UK practice.</li> </ul>	

**Table 3**

For chronic cases, intermittent therapeutic trials of prolonged (4–6 weeks) antibiotics similar to chronic prostatitis<sup>12</sup> with non-steroidal analgesia may be sufficient in some cases. When infective causes have been excluded consideration of referral to chronic pain specialists must also be given, where neuromodulatory analgesics (e.g., gabapentin, pregabalin and amitriptyline) and nerve/cord blocks may be given. It is important to emphasise to patients that surgical interventions (ultimately orchidectomy) may not lead to resolution of symptoms, although reversal of vasectomy and even epididymectomy may achieve a degree of success in post-vasectomy orchialgia<sup>13</sup>.

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## Indications for Referral

These are summarised in Table 4.

Suspected Torsion
<ul style="list-style-type: none"> <li>• Symptoms not resolving with treatment in terms of antibiotic courses and pain control.</li> <li>• Suspected septicaemia or abscess formation.</li> <li>• GUM assessment if STD suspected (contact tracing etc.).</li> <li>• Paediatric urological assessment in young for any congenital abnormalities - if recurrent problem (as with UTIs).</li> <li>• Suspected chronic epididymitis where symptoms have not resolved with simple analgesics and prolonged repeated antibiotic courses – to rule out anatomical sources of recurrent infection (prostate/bladder).</li> </ul>

Table 4: Indications for Referral

## Complications

These are uncommon, but may include the following:

- Abscess formation, requiring surgical drainage
- Ischaemia / infarction resulting in atrophy
- Persisting hydrocoele
- Chronic epididymitis /chronic pain
- Infertility

## Conclusion

Epididymo-orchitis is a common urological condition presenting to both primary and secondary care. Although the majority of cases resolve with antibiotics it is important to be aware of potential complications and alternative diagnoses as these can lead to long term morbidity.



Fig 3

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## SIMPLE URINARY TRACT INFECTION (UTI)

Holly Bekarma and Andrew M Sinclair



### Simple Urinary Tract Infection (UTI). Case-Based Discussion.

#### Abstract

This Case-Based discussion focuses on a patient presenting with a simple Urinary Tract Infection (UTI). It covers the assessment, differential diagnoses and management of the condition.

#### Case History

A 21 years old female patient presents for the first time with a three day history of lower abdominal discomfort, frequency of urination and a burning sensation after voiding.

#### What do you think the cause of her symptoms?

#### How would you diagnose and manage her?

#### Background

<b>Asymptomatic Bacteriuria</b>	2 cultures of urine taken more than 24 hours apart containing more than $10^5$ cfu <sub>(x2)</sub> /ml of the same bacterial organism.
<b>Pyuria</b>	The presence of white blood cells in the urine, implying an inflammatory response of the urothelium either due to infection or an inflammatory condition.
<b>Simple Urinary Tract Infection</b>	The inflammatory response of the urothelium to bacterial invasion, in a patient with a structurally and functionally normal urinary tract.
<b>Complicated Urinary Tract Infection</b>	An infection occurring in the presence of an anatomical or functional abnormal urinary tract.
<b>Isolated Infection</b>	At least 6 months between infections.
<b>Recurrent Infection</b>	More than 2 infections in 6 months or 3 infections in 12 months, due to re-infection with a new organism or bacterial persistence.
<b>Unresolved Infection</b>	Inadequate therapeutic treatment for a previous infection.

**Table 1: Classification of Urinary Tract Infections**

(Adapted from EUA guidelines and Oxford Handbook of Urology)

Urinary Tract Infections are a common condition amongst all age groups with presentations ranging from a generally unwell child to acute confusion in the elderly. There are many definitions associated with urinary infections but a simple urinary tract infection is an inflammatory response of the urothelium to bacterial invasion in a patient with a structurally and functionally normal tract (see Table 1).

It is important that key questions are asked in order to establish the correct diagnosis, which in turn will allow the appropriate treatment to be started promptly and prevent subsequent ascending infections and sepsis from developing.

Urinary tract infections can be caused by a variety of organisms but are most commonly caused by the ascent of enteric organisms from the gastrointestinal tract to the urethra. It is possible for bacteria to be spread haemotogenously or via the lymphatics from another source within the body.<sup>1</sup>

Risk factors for developing UTI's include female sex, increasing age, low vaginal oestrogen levels, pregnancy, diabetes, previous UTI'S, long term catheters, stone disease and genitourinary malformation.

The differential diagnosis will vary depending on the age of the patient and other information obtained from a thorough history. In children, vesico-ureteric reflux should be considered whereas in a 70 years old heavy smoker, who has haematuria along with recurrent infections, an intravesical lesion must be excluded. Other differentials to be considered include vulvo-vaginitis, sexually transmitted diseases, urinary calculi, recurrent and unresolved infections, pyelonephritis, interstitial cystitis and prostatitis in men.

#### History

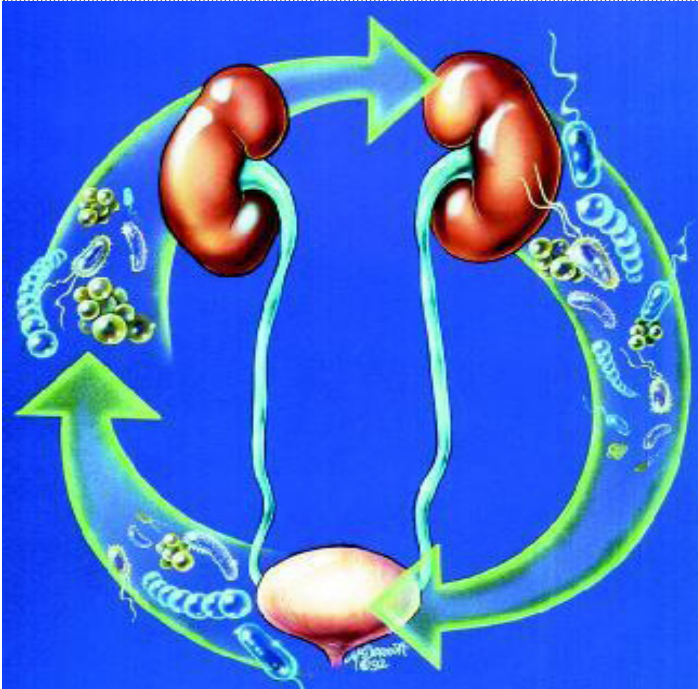
##### Presenting Complaint

There are some specific areas that should be covered during the history to confirm your diagnosis and identify the unwell and potentially septic patient.

- When did the symptoms start?
- Can you describe about pain – site, onset, characteristic, radiation, triggers/relievers and severity?
- Are you suffering from frequency, urgency or burning after urination?
- What colour is your urine?
- Your urine cloudy or offensive smelling?
- Can you see blood in it?
- Have you been incontinent?
- How do you feel in yourself?
- Any fever, shaking or vomiting?
- Do you have any loin pain? Is it unilateral or bilateral?
- Is this a new or recurrent problem?
- Are you sexually active? Any new or different discharge?

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**Past Medical & Surgical History** – other infections, diabetes, abdominal or pelvic surgery, obstetric history and immunocompromised states.

**Drug History and Allergies** – any regular prescribed or over the counter medicines.

**Social History** – fluid intake, alcohol consumption, smoking status and occupation.

**Family History** – family members with recurrent infections or stone disease.

### Examination and Investigations

Perform a thorough abdominal examination to establish areas of maximal tenderness along with basic observations of pulse, blood pressure and temperature. Vaginal, rectal and testicular examinations should be included to exclude alternative diagnoses and identify any complications of UTI.

Ask the patient to provide Mid Stream Urine (MSU) sample to reduce contamination. This sample can undergo urinalysis and then be sent to laboratory for microscopy, culture and sensitivity. The presence of nitrites and leucocytes in the urine has a high positive predictive value for infection. It is also important to note the white cell and red cell count, as these are important in establishing differentials. White cells will not be seen if the sample has been contaminated by body flora when taken. Red blood cells can also be present in urine samples with renal stones, malignancy, trauma or glomerular disease.

For a first presentation of a UTI, patients should have their blood glucose levels checked to exclude diabetes. In recurrent infections, a KUB (kidney, ureters & bladder) X-ray, ultrasound imaging of the renal tract and post micturition scans should be performed. In men, a KUB, renal tract ultrasound and post void bladder scans should be performed after the initial infection to optimally assess the urinary tract.

It is important to consider a Chlamydia infection in patients with symptoms of a urinary tract infection but have a negative urine culture or a culture of white cells but not identified growth. An easy and convenient test for Chlamydia is urine PCR. The patient simply provides urine sample in a special transport medium which can be analysed at a designated laboratory.

### Management

Despite there being little firm scientific evidence, one of the key aspects of the management of UTI's is to encourage patients to make certain lifestyle changes. Reputable websites from the British Association of Urological Surgeons and [www.patient.co.uk](http://www.patient.co.uk) make the following recommendations.

- Maintain a fluid intake of 6–8 glasses of water a day.
- Void frequently to empty the bladder and clear any bacteria, aiming to pass at least 2 litres of urine a day.
- Void before and after sexual intercourse.
- Wipe from front to back after using the toilet.
- Take showers rather than baths and avoid heavily scented products that can cause vaginal irritation.
- Wear cotton underwear and avoid tight fitting trousers or nylon underwear which traps bacteria.

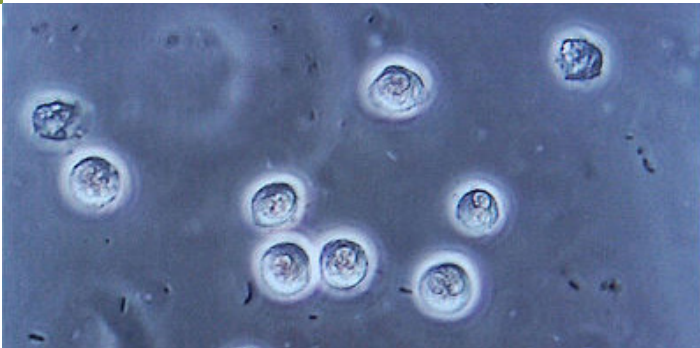
However there has been research into the benefit of taking cranberry based products, which have been shown to reduce the frequency and severity of infection.

If confirmed by dipstick urinalysis and the symptoms are consistent with a urinary infection then patients should be initiated on treatment per your local guidelines with a formal MSU also being sent. The use of antibiotics is recommended due to the clinical success of symptom resolution in patients who take them compared to those who do not.



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The European Association of Urology provides guidance on the preferred antibiotics for treating simple urinary tract infections.<sup>1</sup> They have a variety of suggestions depending on local organisms, availability of drugs, cost and side effects but a typical treatment guideline would be:

- **Pivmecillinam 400mg od 3 days,**
- **Nitrofurantoin 100mg bd 7 days,**
- **2nd line – trimethoprim 200mg bd 5 days.**

1. In patients where symptoms are not resolving consider changing antibiotics once the sensitivities have been established from the urine culture.
2. If the patient has systemic symptoms of fever, rigors and flank pain admission to hospital for IV antibiotics may be necessary.
3. If PV examination suggests pelvic inflammatory disease or other gynaecological causes then referral to the appropriate speciality is required for focussed management.
4. When urinalysis and MSU are normal and Chlamydia testing is negative an alternative diagnosis must be sought for the patient's symptoms.

### Follow-up

Usually no follow up is required for a simple urinary tract infection however, if infections become recurrent and frequent with worsening symptoms referral for further investigation should be arranged.

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## PROSTATITIS AND CHRONIC PELVIC PAIN SYNDROME

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### Prostatitis and Chronic Pelvic Pain Syndrome. Case-Based Discussion.

#### Abstract

This discussion is based on a 39 year old gentleman presenting with prostatitis and discusses the assessment, differential diagnosis and treatment of the condition.

#### Case History

A 39 year old gentleman is referred to the Accident and Emergency Department with a 4 days history of worsening storage (urinary frequency, nocturia, urgency and dysuria) and voiding (hesitancy and reduced urinary stream) Lower Urinary Tract Symptoms (LUTs) associated with fever, malaise and perineal pain. On examination, he appears septic (pyrexia of 38.3oC, tachycardia of 110bpm) and has a tender prostate on Digital Rectal Examination (DRE).

#### What is the likely diagnosis and how would you like to investigate him further?

As with all patients, a thorough assessment is required to ensure that a list of differential diagnoses can be generated. Appropriate resuscitative measures should be instituted early and prompt control of his sepsis achieved.

#### Terminology

The term 'Prostatitis' literally means prostatic inflammation but as a clinical entity, it has previously encompassed both acute (<3 months duration) and chronic bacterial infections of the prostate as well as pain syndromes that are attributable to the prostate but are inflammatory (non-infective) and even non-inflammatory in aetiology. Contemporary practice has seen the term prostatitis reserved for use in acute and chronic bacterial infections and, where no clear aetiology for prostatitis symptoms has been identified, the term Chronic Pelvic Pain Syndrome (CPPS) is preferred.



#### Aetiology

Histologically, the tissues surrounding the prostate acini are infiltrated with inflammatory cells. The commonest infective agents are Gram negative Enterobacteriaceae (Escherichia Coli, Pseudomonas Aeruginosa, Klebsiella, Serratia, Enterobacter Aerogenes) (see Table 1) (1-3) and risk factors include: Urinary Tract Infection (UTI); Sexually Transmitted Infection (STI); acute epididymitis; urethral catheterisation; transurethral surgery; intraprostatic ductal reflux; phimosis and prostatic stones (4). The aetiology of non-infective prostatitis is poorly understood and it is important to differentiate it from infective cases.

<b>Aetiologically Recognised Pathogens</b>
<i>Escherichia coli</i>
<i>Klebsiella spp.</i>
<i>Proteus mirabilis</i>
<i>Enterococcus faecalis</i>
<i>Pseudomonas aeruginosa</i>
<b>Organisms of Debatable Significance</b>
Staphylococci
Streptococci
<i>Corynebacterium spp.</i>
<i>Chlamydia trachomatis</i>
<i>Ureaplasma urealyticum</i>
<i>Mycoplasma hominis</i>

Table 1

#### Assessment

**During the initial assessment of patients with prostatitic infection, it is important to:**

- rapidly determine whether any immediate resuscitative measures are required to stabilise the patient before further action is taken (including the need for critical care support),
- exclude other urogenital and anorectal conditions and therefore confirm that symptoms are indeed attributable and localised to the prostate,

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c) ensure that there are no other manifestations or complications of lower urinary tract infection (retention of urine, epididymo-orchitis, pyelonephritis, prostatic abscess), and

d) finally, corroborate the clinical diagnosis of prostatitis with laboratory investigations to allow accurate diagnosis and definitive classification.

#### History

After stabilising the patient where appropriate, a detailed history and examination are required. The predominant symptoms in prostatitis include pain and LUTS.

#### Where is the pain?

The pain tends to be perineal in approximately half of patients but may involve the scrotum and testes (39%), penis (6%), bladder (6%) and lower back (2%) (5).

#### What is the pain like?

The pain is dull and continuous but may be severe and significantly affect an individual's quality of life.

#### Are there any exacerbating or relieving factors?

It may increase on micturition or ejaculation.

#### Are there any urinary symptoms?

Any combination of storage and voiding LUTs may be evident but typically the patients have difficulty in urinating (straining and weak stream), strangury (the frequent desire to void) and dysuria (6). The pain and voiding symptoms may result in retention of urine for some individuals.

#### Is there a history of sexually transmitted disease or has the patient had unprotected intercourse within the last 3 months?

STIs are a risk factor for all male UTIs and a detailed sexual history is mandatory in the assessment of patients with suspected prostatitis.

#### Is there any significant past medical or surgical history?

In addition to a thorough review of systems, the patient's past medical and surgical history will help exclude alternative sources of sepsis as well as identify any potential risk factors for infection.

#### Examination

A safe approach to all septic patients is to assess their (airway (A), breathing (B) and circulation (C)) and intervene with appropriate resuscitative measures as required. Once stable, a general and the following specific examinations are required:

##### Abdominal

Palpation and percussion for a urinary bladder should be performed to ensure the patient is not in urinary retention.

##### External Genitalia

The importance is to exclude other differential diagnoses and complications of UTI (epididymo-orchitis, etc.).

##### Digital Rectal Examination

Often reveals a normal prostate but with acute prostatitis the prostate may be swollen and tender. A 'boggy' prostate suggests an abscess. DRE provides an opportunity to exclude anorectal and perineal conditions (e.g., perineal pain secondary to perianal abscess).

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### What would you do next?

#### Basic Further Investigation

- Urinalysis and MSSU
- Urethral swab for culture and sensitivity (prior micturition) or Urinary PCR for *C. trachomatis* and *N. Gonorrhoea*
- Routine blood tests (FBC, U+E, CRP)

#### Advanced Further Investigation

Additional investigations should be tailored to the individual patient's symptoms and their chronicity. For example, if an individual has lower abdominal pain and strangury, it may be that radiological imaging is required to exclude a distal ureteric calculus. Furthermore, although voiding LUTS may settle after successful treatment of an acute bacterial prostatitis, a patient with CPPS and problematic voiding would need further investigation with uroflowmetry and a bladder diary.

### Determining the Type of Prostatitis

Localisation of symptoms and signs to the prostate may be difficult based on history and examination alone and the mainstay of diagnosis is qualitative bacteriology localisation cultures of urine and Expressed Prostatic Secretions (EPS). Originally described by Meares and Stamey in 1968 (7), the 'Four Glass' localisation test involves the collection of four sterile samples for microscopy, microbiological culture and sensitivity (see Table 2) and depending on the distribution of positive cultures, determines the source of infection. The National Institute for Health (NIH) in the USA have provided guidance as to the classification of prostatitis and CPPS based mainly on these microscopic and bacteriological findings (see Table 3) (8).

Sample	Sample Type	Positive Sample Indicates?
VB1	First 10mL of urine voided	Urethritis or Prostatitis
VB2	Midstream specimen of urine	Cystitis
EPS	Expressed Prostatic Secretions	Prostatitis
VB3	First 10mL of urine voided after prostate massage	Prostatitis

Table 2

Type	Name and Description
I	Acute bacterial prostatitis
II	Chronic bacterial prostatitis
III	Chronic abacterial prostatitis/CPPS
IIIA	Inflammatory CPPS (white cells in semen/EPS/VB3)
IIIB	Non-inflammatory CPPS (no white cells in semen/EPS/VB3)
IV	Asymptomatic inflammatory prostatitis (histological prostatitis)

Table 3

### Treatment

#### Antibiotics

Antibiotics are potentially life-saving in acute bacterial prostatitis, recommended in chronic bacterial prostatitis and may be tried in inflammatory CPPS. Microbiological cultures and sensitivities should guide anti-microbial therapy wherever possible though at a minimum, specimens should be sent for culture before empirical treatment is commenced.

If a severe acute bacterial prostatitis is suspected or confirmed, parenteral administration of high dose broad-spectrum penicillin (e.g., Co-Amoxiclav), third-generation cephalosporin (e.g., Cefuroxime) or a fluoroquinolone (e.g., Ciprofloxacin) should be promptly instituted, often in combination with an aminoglycoside (e.g., Gentamicin). Once the pyrexial illness subsides, the intravenous to oral switch can be undertaken and oral treatment continued for 2–4 weeks (9). In less severe cases, a fluoroquinolone may be given orally for 10 days (10).

The Fluoroquinolones (such as, ciprofloxacin and levofloxacin) are the recommended antibiotics in chronic bacterial prostatitis and inflammatory CPPS (type IIIA) with good antibacterial activity against Gram negative bacteria (and in the case of Levofloxacin), Gram positive and 'atypical' pathogens, such as *C. Trachomatis* and genital mycoplasmas. In chronic bacterial prostatitis and inflammatory CPPS, antibiotics should be given for 2 weeks after diagnosis. The patient should then be reassessed and antibiotics continued for a further 2–4 weeks only, if bacteriology is positive or the patient reports symptomatic improvement from the treatment. If intracellular bacteria have been detected or are suspected, tetracyclines or erythromycin should be given (3).

#### Antibiotics and $\alpha$ -blockers in Combination Therapy

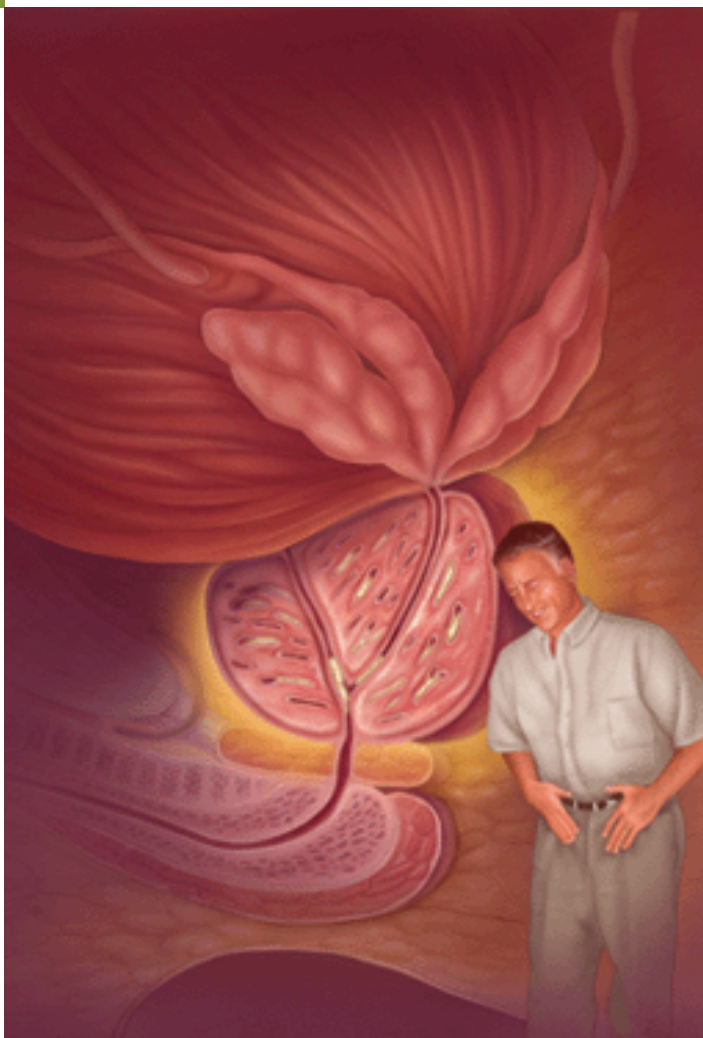
Urodynamic studies have shown increased urethral closing pressures in chronic prostatitis patients (10). In order to reduce intraductal reflux and improve urinary flow, concurrent administration of  $\alpha$ -blockers and antibiotics has been reported to have a higher cure rate than antibiotics alone in type IIIA and IIIB CPPS (11).

#### Other Therapies

Unfortunately, prostatitis and more specifically CPPS are relapsing-remitting conditions and in the case of CPPS, often no cause is ever found. Patient education is vital to the counselling process. With refractory cases, the aim of treatment is focussed on symptom control and this may be best delivered by a chronic pain specialist. In addition to an  $\alpha$ -blocker, patients will often be tried on combinations of non-steroidal anti-inflammatories, 5 $\alpha$ -reductase inhibitors (e.g., Finasteride), Pentosan Polysulphate sodium, neuroleptic medications (e.g., Gabapentin) as well as low dose tricyclic antidepressants. Psychological support and biofeedback are useful adjunctive management strategies.

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### Surgery

A positive effect of Transurethral Resection of the Prostate (TURP) has been demonstrated in very symptomatic patients and even radical prostatovesiculectomies have been performed. However, the data supporting the use of such procedures is not strong and, at best, these procedures should be reserved for appropriately counselled chronic cases. Overall, beyond insertion of a urinary catheter (preferably a suprapubic) if the patient is in retention or the drainage of a prostatic abscess, surgery should be avoided.

### Conclusion

In summary, the comorbidity associated with Prostatitis and CPPS poses a significant burden to patients as well as a significant diagnostic and therapeutic challenge to General Practitioners and Urologists. The treatment and prognosis depends on accurate initial diagnosis to classify the correct type of Prostatitis and is supported by the delivery of good quality patient information.

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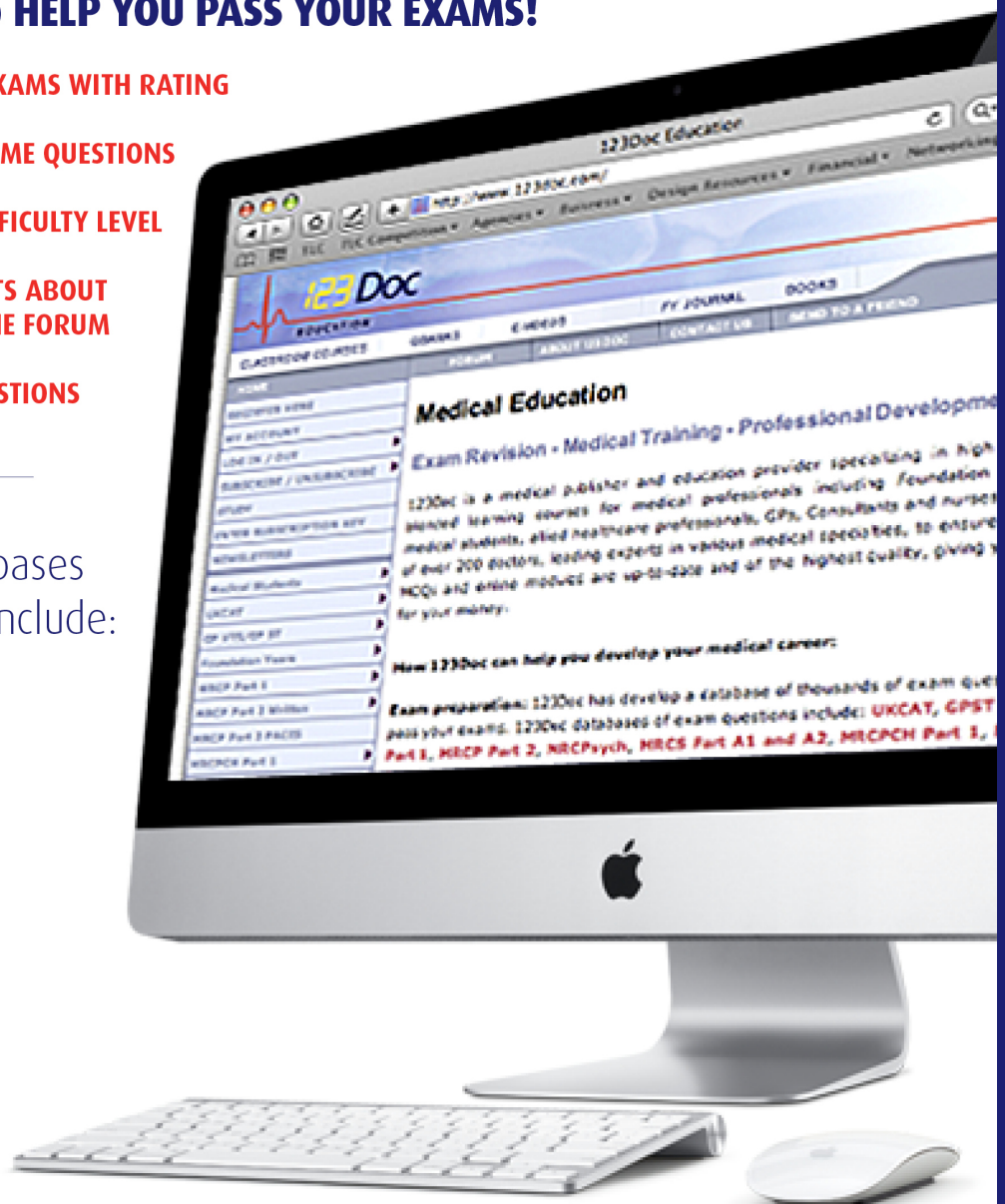
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