

FOUNDATION YEARS JOURNAL

JANUARY 2015

Volume 9, Issue 1: Urology - Part 2





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FOUNDATION YEARS JOURNAL 2015

Volume 9, Issue 1

Foundation years journal

Foundation Years Journal is an international peer-viewed journal which seeks to be the pre-eminent journal in the field of patient safety and clinical practice for Foundation Years' doctors and educators. The Journal welcomes papers on any aspect of health care and medical education which will be of benefit to doctors in the Foundation training grade in the UK or international equivalents.

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Foundation Years Journal is the ONLY journal for Foundation Years, doctors and educators, specifically written according to the MMC curriculum. It focuses on one or two medical specialties per month and each issue delivers practical and informative articles tailored to the needs of junior doctors. The Journal closely follows the Foundation Years syllabus to provide the best educational value for junior doctors. In addition to good clinical and acute care articles, assessment questions give junior doctors the chance to gauge their learning. Each issue provides comprehensive clinical cases for trainees as well as practical teaching assessments for educators. Readers will benefit from:

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BREAKING BAD NEWS: A REFLECTION

V Yioe



Abstract

Breaking bad news is one of the most challenging tasks for every doctor, especially foundation doctors. They often get anxious when they are asked to discuss end of life care and Do Not Attempt Resuscitation (DNAR) status with patients and family. They often feel that these topics are out of their depth and fear the family / patient would ask questions which they aren't able to answer. Although it might be unfair to put such a responsibility to foundation doctors, especially newly qualified FY1s, all doctors should be ready to discuss these topics when appropriate.

Therefore, I think we should offer the opportunity to the juniors to break bad news under direct supervision where senior is present to advise and take over if things go wrong. This will make juniors more comfortable and less nervous. It's often difficult for juniors to have the chance to break bad news under direct supervision due to the high workload but it'll be a good opportunity to practice their communication skills and improve their confidence.

The story

Working as a junior doctor in respiratory, especially during winter is very demanding. Not only is the turn over rate very high but also the patients can often be really unwell and palliative management often needs to be considered. Therefore, breaking bad news is a very crucial skill.

As a core medical trainee year 1 (CMT1) in respiratory, I was working alongside another FY1 and two registrars. There was also another team with FY1, CMT1, and two registrars. On one afternoon, I was asked by the FY1 from the other team to review an unwell patient, decide on further management and discuss with the patient and his family regarding palliative management if that is more appropriate. The FY1 was uncomfortable in making this decision and discussing with family, and his seniors were unavailable. From what I understood, I felt palliative management was more appropriate. Patient had end stage lung cancer and was awaiting transfer to the hospice. At the time, he was scoring at 4 in the National Early Warning Score (NEWS) due to his temperature (39.5°C) and systolic blood pressure of 95 mmHg.

Breaking Bad News: A Reflection Teaching & Training

Initially, I was really frustrated and found it hard to grasp what was going on and I had to spend time to look through all the notes to get a better picture. On review of the notes, it was documented that patient should be managed palliatively if further deterioration took place. The palliative care team were already involved and agreed that patient has deteriorated significantly in the past few days and comfort medications should be started to manage symptoms.

On reviewing him clinically, my impression was that he was dying and we should try to keep him comfortable and withdraw active treatment. The patient at the time still had capacity and his relatives were waiting outside whilst I was reviewing him. I asked him if he would prefer me to speak to his relatives first and he told me to discuss with his family first. I brought his family to the quiet room and discussed end of life care.

I felt it was quite a straightforward discussion as family was realistic and understood that he was deteriorating rapidly. The family agreed that it would be in his best interest. However, they agreed that since he still had the capacity, we should discuss this with him. I went to see the patient again and explained to him that his deterioration is most likely due to his underlying carcinoma but it might be due to an underlying infection or both. I explained to him that further investigation and treatment wouldn't change his prognosis and I asked him for his preference.

He then told me "If you can't cure me, please don't do anything anymore". I then explained to him that we would keep him comfortable and start him on end of life medications and stop all his regular medications but he could have the oxygen if that kept him comfortable. He agreed with this and smiled trying to thank me. I went out and explained to the family what is going to happen next and liaised with the nurses.

Although it was a daunting task, I found it very rewarding to manage this challenging discussion where it took time and careful approach. Patient and family were not only grateful that they had been involved in the discussion, but also had really appreciated the management.

On the other hand, the FY1 was distressed as none of his senior was available and he was uncomfortable to make the decision and approach this discussion. He was also being put off by the workload on the ward. I discussed this with the nurses and the seniors of the team subsequently whom agreed with my management.

BREAKING BAD NEWS: A REFLECTION

V Yioe

What I learnt

Breaking bad news is one of those skills that develops with experience as you progress through your training and become more confident. As a foundation doctor, I was also uncomfortable when I was asked to discuss this and always sought advice from seniors correctly. By observing my seniors breaking bad news, I picked up many important skills and implemented them into my own approach.

Even now, there is always one area that I find it really challenging. It is when either patient or family is in denial and they might become verbally or physically abusive. If this happens, we should always stay calm and get help early. A presence of a nurse will often help in this situation to provide support to patient, family, and the doctor.

However, I regretted that as a foundation doctor I was never offered a chance to break bad news with a direct supervision from my seniors. I think it would help to build up my confidence and someone could advise me what I have done wrong and well in that situation. Of course, this would also be an opportunity to obtain feedback from someone more experienced.

With the above "story" and my personal experience as a foundation trainee, I realised that we often don't get adequate training in breaking bad news. This has made me change my practice in which I sometimes offer to observe foundation doctors break bad news and they will feel more comfortable in presence of a senior. It would also serve as an opportunity for a supervised learning event.

In Good Medical Practice (2013) by the General Medical Council, it was advised that we must communicate effectively with our patients. This includes the ability to listen, take account of their views and respond honestly to their questions. (1) This is increasingly more important and end of life care and dying with dignity is a hot topic in the media. We should involve the patient and the family when possible regarding his illness, deterioration, and how he would like to be cared for in his last few days of life. Therefore, effective communication in this challenging area should be done carefully.

In conclusion, breaking bad news might be a daunting and challenging conversation with patients and relatives. However, we could turn this tremendous conversation into a better one if we could approach this calmly. Always ask for help early, if you are uncomfortable with it. Foundation trainees also should only attempt to break bad news if they feel comfortable as there is only ever one chance to break bad news and it is difficult to rescue if done badly. Therefore, we need to learn this important skill by considering to break bad news under direct supervision when there is an opportunity.



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Financial statement

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'OH PLEASE! DON'T TELL HER SHE HAS CANCER.' ETHICAL DILEMMA WHEN BREAKING BAD NEWS

L Shenbagaraj



Abstract

Breaking bad news to patients who are seriously ill and have a poor prognosis is a complex and contentious issue. Arguments for disclosure of bad news generally appeal to the basic ethical principles such as respect for patient autonomy, doing good (beneficence) and avoiding harm (non-maleficence). Objections to disclosure also appeal to serious ethical considerations such as avoiding harm, ensuring patient well-being and maintaining hope. Patients and families differ in their needs for levels of information and responses to unfavourable news. Further, it is not uncommon for family members to request non-disclosure of terminal diagnosis to patient.

This article touches upon these pertinent issues – terminally ill patient, distraught relatives and an emotional appeal for non-disclosure. The experience has reinforced my belief that patients need to be told what they wish to know with utmost compassion and sensitivity, while ensuring adequate family support.

In today's digital age, where texting and typing seems to be more common than talking and listening, communication is more important than ever before. Medical professionals are at the epicentre of communication - with patients, relatives, fellow colleagues, the general public and the media. My experience highlights one of the most difficult communication challenges frequently encountered in our clinical practice - breaking bad news.

I was the Foundation Year 2 doctor on the medical ward on a busy Friday afternoon. An 80 year old lady with left-sided weakness had been repatriated to us. The handover was she had been on a holiday and had unfortunately suffered a stroke the day before.

'Oh please! Don't tell her she has cancer.' Ethical dilemma when breaking bad news Teaching & Training

While checking her notes, the scans reported multiple cerebral metastases with haemorrhagic transformation and a lung primary. This was not communicated to us by the transfer team. The ward sister and I decided the best approach would be to discuss with the patient's family first because of the uncertainty of what the patient knew. We obtained the patient's consent for this and discussed with her family in private. Neither the patient nor her family were aware of any of her underlying sinister problems. They were extremely upset and requested not to tell the patient about her cancer. They feared she would definitely break-down as she was an extremely nervous and emotional person.

I emphasised it was imperative to keep her informed, especially for difficult decisions and choices that she might have to make. I assured them it would only be in her best interest, and the situation would be handled sensitively. I explained it was ethically and legally not possible to hide the diagnosis from the patient, if she wanted to know it. They agreed with my reasoning and requested me to be the bearer of the bad news.

I broke the bad news to the patient in layers, with sympathy and empathy. Surprisingly, the patient took it on the chin and did not break-down. Rather, she was determined to plan and make the best of her remaining time. I had already contacted the Macmillan Nurse who came in to offer further support.

I discussed the patient later with my Registrar and Consultant. They agreed with my approach and said that I had handled the situation well. I felt reassured that I had done the appropriate thing for the patient.

Ethical issues

This experience demonstrated the importance of beneficence and non-maleficence, in addition to autonomy in such situations. On reflection, the main ethical issue was to decide between truth telling and nondisclosure. Relatives may at times regard truth telling as potentially harmful to the patient, whereas, as medical professionals we tend to consider it a part of autonomy and beneficence.

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We think that by explaining the truth about diagnosis, prognosis, and treatment options to the patients, the basis for a good professional relationship and the exercise of freedom is generated. Under this perspective, deception appears to be harmful, because it may destroy the foundations of the doctor-patient relationship and it prevents the patient from making free and informed choices (1). I believe that patients should be told what they wish to know, while still trying to keep the family on board with the whole process.

What I learnt

1. It is imperative to understand the patient's preferences for receiving information – either alone or with family members, or sometimes from family members. Discussion with the family to understand their perspectives about disclosure is also critically important (2).

2. It is crucial to include the family at key junctures like conveying new information and decision-making, as these are emotionally difficult times for both the patient and family.

What I will do differently next time

Next time, I would consider approaching the patient first to check their understanding of the illness rather than the family.

I would have an early discussion with the patient regarding his/her preferences for receiving information, desires about involvement in clinical decisions, and the extent of family involvement he/she would like.

Unfortunately, on that day, I was the only doctor in the ward. When faced with a similar situation in the future, I would involve my seniors earlier.

Moving forward in my career, this experience has strengthened my communication skills, and instilled in me greater confidence to deal with such tricky and challenging situations. I would like to conclude by quoting Lyckholm (3)

'If we are to take the charge of caring for very ill and vulnerable patients, then truth telling must be one of our most precious duties. It is important for patients to know what lies ahead of them so they may make final life choices. It is out of respect for their autonomy that we must be honest about their prognosis. Patients need to plan financially, psychologically, and emotionally. They need the chance to make peace, to say I love you, to say goodbye.'

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HOW TO MAXIMISE TEACHING OPPORTUNITIES DURING A UROLOGY WARD ROUND

KCA Ho, K Wong & M Ahmed



Abstract

Although ward rounds offer a range of learning opportunities, they are currently not well utilised by Foundation Trainees. This is due to a number of barriers to learning on ward rounds and there is keen interest to develop and improve the educational value of the ward rounds for Foundation Trainees. This article proposes the use of the framework called The Three 'P's to help Foundation Trainees maximise the learning opportunities available during on a Urology ward round.

Introduction

For the Foundation Trainee, ward rounds are a significant part of the working day. This does not come as a surprise given the importance of the ward round: they are essential and key to patient safety – it is where all the patients are seen and reviewed. Investigations, treatment and discharge plans are often made during the round (1).

However, the conduct ward round is often less than ideal, particularly on a surgical firm; senior trainees and Consultants often have limited time for this activity before they rush off to start their operating list or clinics. As a result, the scope for training and teaching is largely ignored. In light of the circumstances, the Foundation Trainee is often unaware of the learning opportunities available on a ward round and thus do not utilise the opportunities to the maximum potential (2). Furthermore, there are a number of observed barriers to effective learning: in addition to the fast pace of the ward rounds as already mentioned, there is often a lack of organisation and structure (3).

There have been suggestions about how to improve the effectiveness of the ward round as a teaching tool, such as having junior doctor led ward rounds or the inclusion of a clinical teaching fellow (3,4). This article will provide the Foundation Trainee with a framework to effectively lead a ward round to maximise the learning opportunities that are available during the Urology ward round.

How to maximise teaching opportunities during a urology ward round

Teaching & Training

The three 'p's

There are many ways to conduct a ward round. This article proposes a framework called The Three 'P's. This stands for: Prepare, Participate and Plan. This framework ensures that the ward round is conducted in an organised manner to ensure all patients' care is coordinated in accordance with the guidance for doctors acting as responsible consultants or clinicians (5).

Prepare

There are three aspects to a ward round that require thoughtful preparation: the team, the handover and the list.

The Team

Each member of the ward round has a role. The multidisciplinary team is vital to an effective good ward round (1). The key members are the decision maker, usually the consultant or the specialist registrar, junior team including foundation doctors and senior house officers, and ward sister. It is important not to underestimate the role of the nurses in a ward round, as they are able to effectively communicate patient preferences and views of the medical teams (1).

The Handover

Increasingly, there are concerns regarding patient continuity of care with changes to shifts and working hours secondary to pressure from the European Working Time Directive (6). The handover process therefore becomes critical in ensuring that information is not lost during change of personnel and team, particularly from night to day. In particular, unwell patients or patients who need operative intervention should be highlighted.

In Urology, this may include the patient with the septic obstructed kidney who will require urgent decompression or the patient with clot retention who may require cystoscopy and washout. Prioritising patients is a very good learning exercise and help you to gain an understanding and appreciation of the acute emergencies in any surgical speciality. In addition, prioritisation is a universal skill in medicine and surgery that is transferable across many specialities.

HOW TO MAXIMISE TEACHING OPPORTUNITIES DURING A UROLOGY WARD ROUND

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The list

The list is a simple document that includes all the patients that the team is currently looking after. By using the list as a reminder for each patient, this allows full concentration on ward round and facilitates improved learning. In addition, the list forms the framework for handover and referrals. With each case summarised, it is possible for new members of the team to come in and know what the current issues are and the plan moving forward. Every team will have their own variant on the amount and type of information on the list. The important part is to make the list your own whilst including all the critical bits of information to allow you to recall the patient. The recommended headings include:

Patient location

Patient details

Patient history and diagnosis

Significant past medical and surgical history

Investigation results

Current issues and plan

Patient location and patient details

It is of vital importance to check the patient's location daily prior to the ward round so that no patients are missed. The essential patient details would include the patient's full name, date of birth, hospital number and age. The patient list contains patient sensitive information and protecting the patient's right to confidentiality is paramount, so extra care should be taken not to leave the list lying around (7). When working in a department where there is more than one consultant, it is important to note the consultant who has overall responsibility of the patient as this is in keeping with new guidance for all patients to have an identifiable clinician assigned to them (5).

Diagnosis and patient history

From experience, it is often useful to use the key information on the patient list as prompts to help present each patient to the consultant. As we very well know, consultants' time is pushed. Therefore, if the consultant knows the patient, only a succinct recap of the patient's initial presenting complaint and a summary of the happenings over the past 24 hrs are required. This would include important blood and imaging results as well as outstanding investigations. The list allows you to prepare your presentation to your team in a structured and coherent fashion, which will allow your seniors to make clinical decisions more effectively. Each time a patient is presented on the round, there is a potential learning opportunity and trainees often find the feedback very useful (2).

Significant past medical and surgical history

A patient's past medical history can often influence management options and thus it is vital to have the information at hand when needed. For example, for a patient with haematuria, it is important to know whether a patient is on any anticoagulation such as warfarin, as this will impact the management. For patients with ureteric stones, it is useful to understand if this is the first presentation. When possible, patients with ureteric stones are managed medically, but repeat admission may be an indication for intervention.

Investigation results

This section logs the patient's outstanding and current investigation results. This includes pathology and imaging. It is also often useful to have a trend of blood results and the salient points of any imaging reports. This helps to streamline the ward round and negate the need to return to the computer to check on the scan if it has been reviewed before. As investigations are planned throughout the day, it is important to have this section updated daily on the list.

Current issues & plan

This section contains the details of current management of the patient and any outstanding issues. Remember that the list is used to remind you about all aspects of the patient, so use it to put as much or as little information as you need to achieve this.

Participate

There are three main aspects to consider for effective participation in the ward round and they all are part of the Foundation Curriculum: these are broadly categorised into communication, review and record keeping.

Communication

Concise communication on the ward round is essential to ensuring that patients are given a total review and this skill can be developed each day on the ward round.

A large part of communication involves presenting the patient. Knowing the patient is key, and there are many strategies that may be employed to helping you to keep track of all your patients. The list discussed earlier acts as a prompt for your presentations. The structure of the presentation is also important and it is best when it is organised and structured to allow the team to follow your thoughts in a logical manner. Each person has a different style and therefore, the structure provided here is not intended to be a complete guide as this is outside the scope of this article, but it is intended to act as a foundation for developing this skill, which will be refined each day. Start with the age of the patient and the presenting complaint.

HOW TO MAXIMISE TEACHING OPPORTUNITIES DURING A UROLOGY WARD ROUND

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Then reveal more history or investigation results which will aid the diagnosis or management. Amongst this, the patient's progress through the hospital stay will also be beneficial. This structure should give a framework on which you can adapt to each individual patient and give a concise summary. For example: this is Mr. X, a 34 year old gentleman on day 2 of admission with left renal colic. CT KUB showed a 6mm left mid ureteric stone. His inflammatory markers and renal function is normal. He has been treated with analgesia and the pain is settling. He is currently awaiting stone treatment.

Communication with other MDT members is also crucial to a successful ward round. As mentioned earlier, it is important to have nursing staff representation on ward rounds as this gives new insight into how the patient is progressing from a nursing standpoint and allows the nurse to voice the views and opinions of the patient (1).

This is particularly important for patients who may have other factors limiting discharge such as the need to increase package of care. In these circumstances, the nursing staff are usually better informed about the progress than the medical team and this information is important for discharge planning. Moreover, this promotes respect among all team members, and encourages healthy professional relationships. If nurses are not available during the round, it is important to hand over to the nursing staff what decisions have been made so that the plan moving forward is clear for everyone and questions may be answered if anything is unclear.

Communication with the patient should be conducted in a way that the patient easily understands (1,5,8). Language should be patient-friendly, and easily understandable. Avoid the use of medical jargon, and use lay terms instead. In addition, remember importance of privacy and close the curtains for each patient. Effective discussions may be had on a ward round which will help to build rapport and trust. Here, it is possible to simultaneously find out how the patient is progressing and also update the patient on their management.

If there are relatives by the patient's bedside, it may be necessary to establish beforehand how much information the patient wants disclosed in their presence. From experience, patients that are able to discuss their case and progress are better informed of their diagnosis and management. There have been cases where the patient needs urgent surgical intervention, and it was particularly good to see how the patient was counseled by the consultant about their treatment options and ultimately be consented and site marked for the procedure.

This not only benefits the patient as they are able to comprehend the plan but by witnessing the interaction, this provides a great learning experience and trainees have reported benefit by observing seniors perform these skills, which they are able to incorporate into their repertoire (2)

Review

A clinical review of a patient involves history, examination, review of the bedside charts and any investigation results. The senior decision maker on the round will usually perform clinical history and examination, although some centres allow the juniors to lead this part of the ward round with close observation by the seniors to facilitate learning in a safe environment (4). However, a limitation to this would be the time that a Foundation Trainee takes to review a patient is much longer than a consultant and thus they may not be able to lead on all patients given the time constraints. On days when the take is quieter however this should be encouraged. Not only as a useful learning tool for foundation doctors, but also a chance for senior team members to develop their teaching skills, and provide constructive feedback.

Whilst the senior is engaging with the patient, it is important to observe the important aspects of the consultation, as this is a valuable learning opportunity. In addition, it is important to utilise all members of the ward round and each team member should have a role; whether it be to check the observation chart, or review the drug chart. This ensures that everyone is engaged on the ward round and will facilitate the best learning for all members of the team. When reviewing drug charts, it is important to ensure all prescribed medications are being given. In particular, anti-embolism stockings should also be checked to ensure that they are prescribed and given correctly. This is particularly important for patients with haematuria where low-molecular-weight-heparins may be contraindicated. In addition, the latest investigation results should be reviewed, with an emphasis on any new imaging or significant blood results such as the haemoglobin for a patient with haematuria.

Record keeping

During a fast paced ward round, it is of utmost importance that clear and adequate documentation is performed for patient safety. Medical record keeping forms part of the Foundation Programme Curriculum and is part of good medical practice as outlined by the General Medical Council (5,8,9). Whilst documenting the review and the plan are a bare minimum, it is extremely useful to write a short summary of the patient's admission and progress. In addition, it is useful to document why a certain management plan is being followed.

HOW TO MAXIMISE TEACHING OPPORTUNITIES DURING A UROLOGY WARD ROUND

KCA Ho, K Wong & M Ahmed

This will facilitate the understanding of the thought processes, improve learning and also allow others to understand and follow the plan. As a trainee, if you do not follow the plan, do not be afraid to question it, although it is necessary to be sensitive to the patient being present and some questions may need to be reserved until after the round. This will facilitate your learning as a trainee and also allows for the reasoning to be documented in the notes. As with all entries in patient notes, ensure that it is correctly dated and timed with the most senior doctor's name clearly legible (5). Additionally, remember to sign the entry and include your name, grade and bleep number so that other members of the MDT can contact you.

Plan

The plan is made after the patient review and will include tasks such as referrals, investigations and treatment. In addition to documenting this in the notes as mentioned above, the plan must be effectively carried out. Some tasks, such as prescribing, may be carried out at the bedside under direct supervision, which may allow for another learning opportunity. However, most tasks will need to be done later on and in those circumstances, it is useful to ensure that you make a note of all of the tasks or jobs for each patient and at the end of the ward round the team should meet for a debrief. This is also a good time to take a coffee break and will ensure that the team is refreshed to delegate and tackle the jobs. In addition, this opportunity after the ward round allows the team to discuss any areas of concern and highlight areas that require additional information or detail and reinforce the learning on the ward round. If a ward round is conducted effectively and prioritisation of the jobs are done, you will even find opportunities to attend clinic or theatres. A chance to really get the most out of your urology placement and widen the learning opportunities, and increase the diversity of your day.

Conclusion

Ward rounds are an unavoidable and necessary part of the Foundation Trainee's day. They are usually led by the Foundation Trainees and there are plenty of teaching and learning opportunities available. It is a chance to nurture not only clinical skills but also interpersonal, management and leadership skills. By utilising the Three 'P's structure of Prepare, Participate and Plan, Foundation Trainees will have a better tool to maximise the efficiency and effectiveness when they are leading a ward round, which will lead to improved patient outcomes. It also significantly improves the ward round as a learning experience. Therefore, well-run ward round should not be underestimated as a training opportunity for any Foundation Trainee.

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Financial statement

The authors of this article have not been paid. The Foundation Years Journal is financed by subscriptions and advertising. The Journal does not receive money from any other sources. The decision to accept or refuse this article for publication was free from financial considerations and was solely the responsibility of the Editorial Panel and Editor-in-Chief.

Patient consent statement

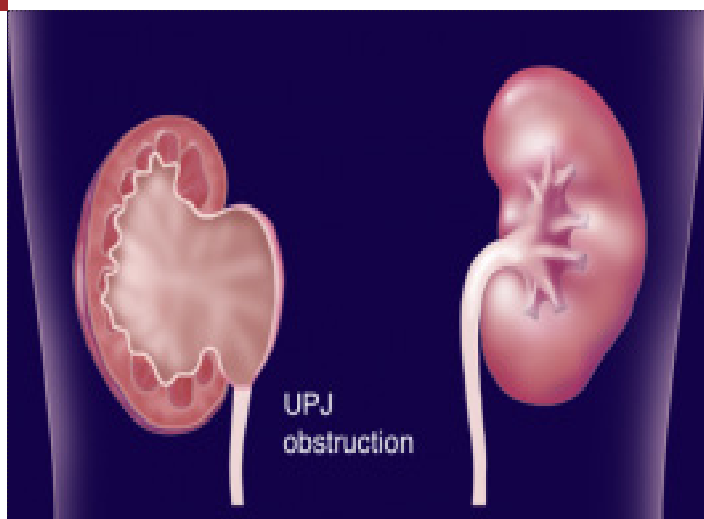
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PELVIURETERIC JUNCTION OBSTRUCTION

B Vadhwana & A Raza



Abstract

Pelviureteric junction obstruction (PUJO) is more frequent in children than adults. Congenital or acquired narrowing of the proximal ureter causes urinary outflow obstruction resulting in hydronephrosis and potential renal impairment. PUJO may be asymptomatic and found incidentally on imaging or present acutely with loin pain, pyrexia or both. Radiological, nuclear imaging and occasionally endoscopic procedures are required to demonstrate the cause and its functional effects.

Case history

A 40 year old gentleman presented with a five day history of left flank pain and microscopic haematuria with a previous history of renal colic.

Background & aetiology

The pelviureteric junction (PUJ) is defined as the connection between the renal pelvis and proximal ureter. Obstruction at the PUJ can be classified as congenital or acquired. Congenital abnormalities represent the most common disease process where the ureter fails to recanalise during embryological development causing an intraluminal narrowing, or uncoordinated peristalsis from disordered smooth muscles cells. (1,2) Other congenital causes include abnormal anatomy such as a high ureteric insertion or crossing vessels i.e. renal, aortic, vena caval or of iliac origin. (3)

Acquired narrowing can be secondary to calculi, scarring from recurrent urinary infections and iatrogenic injuries. Retroperitoneal fibrosis can occasionally cause extraluminal compression at the PUJ. Malignant lesions such as transitional cell carcinoma at the PUJ may also cause obstruction.

PUJO prevents urine outflow into the ureter causing increased pressures within the collecting system and hydronephrosis. It has a higher prevalence in males (male to female 2:1) and more commonly affects the left kidney. (3) It accounts for the majority of cases of hydronephrosis in children. This article will focus on PUJO in adults.

Pelviureteric Junction Obstruction Patient Management

Presentation

PUJO can present with non-specific flank or back pain, renal colic, haematuria or recurrent urinary tract infections. (1,2) Patients may report worsening symptoms with increased fluid intake causing a forced diuresis and over-distension of an obstructed collecting system. (3) Systemic symptoms may include nausea, vomiting, and fever. PUJO may also present as an incidental finding in the asymptomatic patient undergoing imaging for other symptoms.

Investigations

Alongside clinical assessment, bed-side tests such as urinalysis for microscopic haematuria, leucocytes and nitrites, should be performed. If sepsis is present, urine and blood cultures should be taken before starting antibiotics. Blood tests include FBC and CRP to monitor sepsis and serum electrolytes to determine renal function. Radiological investigations will be guided by the presentation and local imaging protocols.

A CT KUB is often the first radiological test performed if the patient presents as an emergency. Alternatively an ultrasound KUB might be performed if this is not available or there are contraindications to a CT KUB e.g. in pregnancy, an ultrasound KUB is used to minimise radiation exposure. If there is uncertainty about the cause of the PUJO, a CT intravenous urogram (CT IVU) can be performed provided the renal function is normal (Figure 1 and 2).



Figure 1: CT intravenous urogram, coronal view: dilated right renal pelvis secondary to a PUJO.

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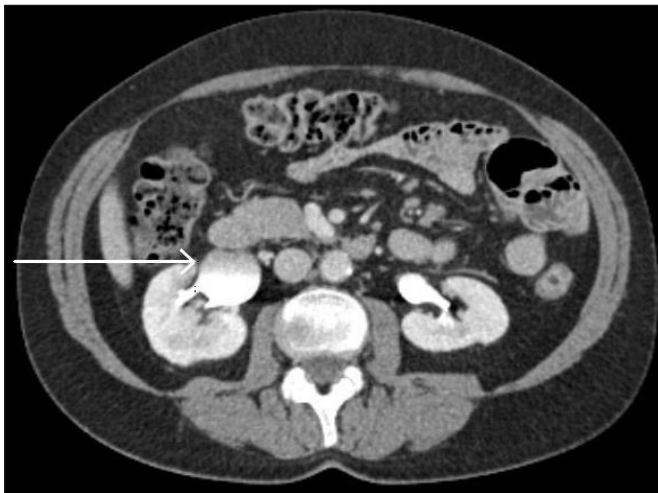


Figure 2: CT intravenous urogram, axial view: dilated right renal pelvis with retained contrast secondary to a PUJO.

If a CT IVU does not adequately demonstrate the cause of the PUJO, a retrograde study or ureteroscopy may be necessary (Figure 3).

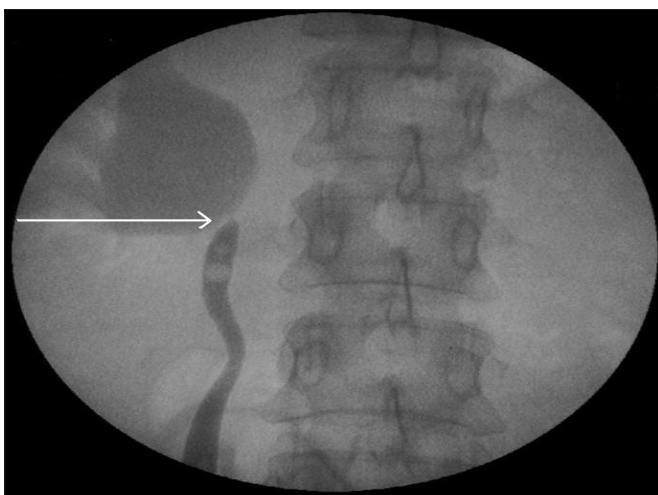


Figure 3: Endoscopic approach with retrograde (contrast) injection demonstrating PUJO. Air bubbles can be seen in the proximal ureter.

If minimally invasive surgery (endopyelotomy) is being considered, a CT is recommended to identify crossing vessels and reduce the risk of intraoperative haemorrhage (3, 4, 5). Nuclear imaging should be performed in an elective setting to assess renal perfusion, drainage and cortical function prior to treatment.

A diuretic MAG3 renogram is useful to assess the degree of obstruction and the differential renal function of each kidney (Figure 4 and 5). Normal functioning kidneys contribute 50% each to overall function. In cases of PUJO, a diuretic MAG3 renogram is the preferred choice pre and post surgery to assess whether obstruction has been relieved and if kidney function has improved. A DMSA scan is a more accurate and useful measure of actual renal function once the obstruction has been treated. (3)

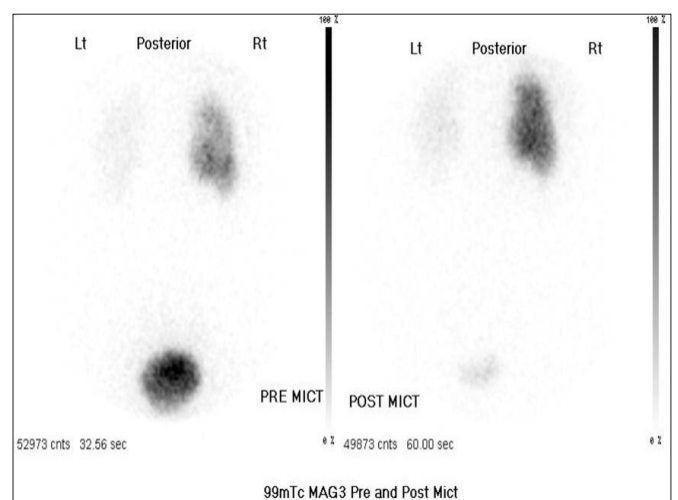


Figure 4: MAG3 renogram: marked right sided pelvicalyceal retention and delayed excretion, demonstrated by the retained tracer.

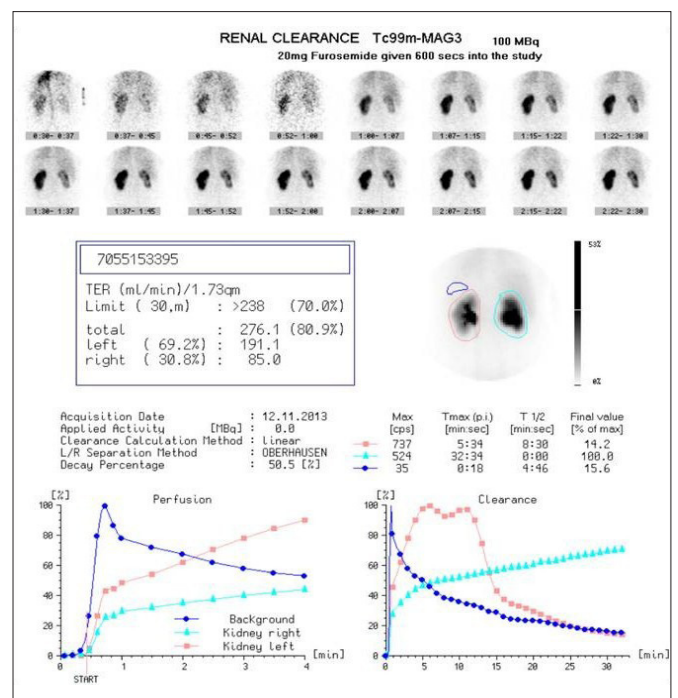


Figure 5: Renography: the blue clearance curve demonstrates delayed excretion and retention of the tracer compared to the left kidney (red curve) in a right PUJO.

PELVIURETERIC JUNCTION OBSTRUCTION

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An ultrasound KUB is usually performed for monitoring cases managed conservatively along with interval renography to ensure renal function is not deteriorating. Serum electrolytes will also be checked. After surgical correction of the PUJ local protocols and availability of imaging modalities determine which investigations are performed to monitor outcomes of surgery. However symptom review is essential as part of the follow up and either ultrasound KUB, renography and or CT IVU can be used for radiological follow up.

Management

Symptomatic PUJO is initially managed with analgesia titrated to pain and antiemetics if nausea or vomiting are present. In cases of sepsis, intravenous fluids and antibiotics will be required. Urgent drainage of the collecting system with a ureteric stent or nephrostomy may also be required depending on the degree of obstruction and degree of sepsis.

Other indications for surgical intervention in the absence of sepsis are a significant hydronephrosis with deteriorating renal function or pain that cannot be controlled with analgesics. The immediate aim is to relieve the obstruction and preserve renal function.

In the elective setting and in the absence of sepsis, surgical intervention may involve an endourological approach to either incise (endopyelotomy) or dilate (endobst) the stricture (4,5). If this is not feasible an antegrade percutaneous approach can be used.

These minimally invasive methods are generally performed in higher risk patients, however, are generally not associated with as good a success rate as dismembered pyeloplasty. An Anderson Hynes pyeloplasty can be performed via open surgery or more commonly now via minimally invasive techniques using laparoscopy or robotic surgery. These latter two techniques have the advantages of reduced post-operative pain and an earlier time to recovery due to smaller wounds.

Pelviureteric Junction Obstruction Patient Management

In the long-term, patient follow-up involves an assessment of symptoms, electrolytes and radiological imaging with ultrasound KUB, renography and occasionally CT IVU if symptoms persist after surgery.

Conclusion

PUJO presents acutely with loin pain or pyrexia, however it can also be found incidentally in asymptomatic patients. It is important to take a thorough history, monitor serum renal function and perform radiological investigations to assess the degree of obstruction.

In the acute setting, immediate drainage of the kidney along with adequate resuscitation and antibiotic therapy are essential. Once the patient is stabilised renography and endoscopic investigations can be performed as an outpatient before definitive management is undertaken.

Patient outcome

Our patient has been undergoing regular follow-up for his PUJO secondary to a benign stricture. Over the past six years his renograms have been stable with renal function at 45% on the affected side; however there is significantly delayed drainage now on the affected side. Most recently he has presented with two episodes of acute loin pain and therefore a pyeloplasty will be offered.

Questions + teaching notes

1) A 26 year old female attends the Accident & Emergency department with right sided loin to groin pain with vomiting. A bedside urine dipstick reveals microscopic haematuria. What is your initial differential diagnosis?

- A. Appendicitis
- B. Ureteric calculus
- C. Bladder carcinoma
- D. Ovarian cyst
- E. Inflammatory bowel disease

2) A plain CT KUB reveals no renal tract calculus but hydronephrosis of the kidney with a transition point at the PUJ. What investigation would you perform next?

PELVIURETERIC JUNCTION OBSTRUCTION

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- A. CT urogram
- B. CT abdomen and pelvis
- C. Cystoscopy and retrograde
- D. Ultrasound KUB
- E. X-ray KUB

3) A CT urogram demonstrates right sided hydronephrosis with contrast retained in a grossly enlarged renal pelvis. What investigations would you consider next?

- A. CT abdomen and pelvis
- B. X-ray KUB
- C. Cystoscopy and retrograde
- D. Ultrasound KUB
- E. Magnetic resonance imaging

4) All of the below are risk factors for PUJO except:

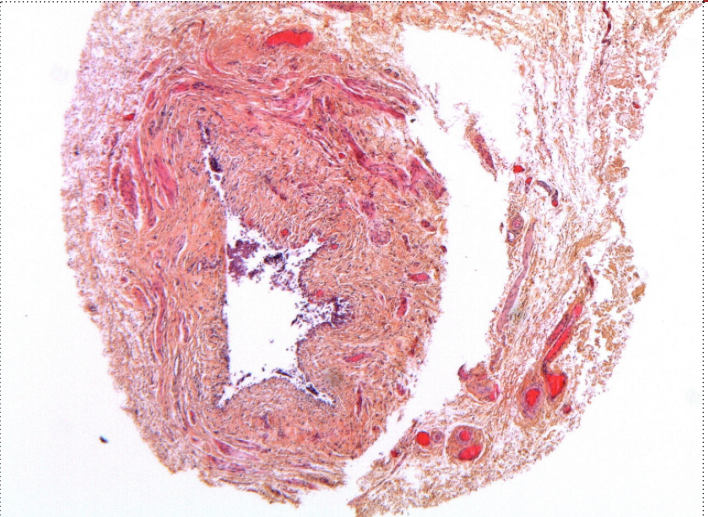
- A. Ureteric aperistalsis
- B. Transitional cell carcinoma
- C. Ureteric calculus
- D. Crossing vessels
- E. Prostatic enlargement

5) A 60 year old gentleman presents with right flank pain, with renal angle tenderness on examination, pyrexia and a tachycardia. Blood tests reveal raised infection markers and acute kidney injury. An ultrasound KUB reveals a hydronephrosis from a possible PUJO. What is the definitive management for this patient?

- A. Culture sensitive antibiotics
- B. Intravenous fluids
- C. Analgesia
- D. CT urogram
- E. Nephrostomy

Answers

1B: A ureteric calculus is the most likely diagnosis given the history and urinalysis. However, in a female of childbearing age you must perform a pregnancy test and obtain a menstrual history as this may invalidate a positive urine dipstick for blood. This will help guide radiological investigations as an ultrasound scan may be used instead of the standard CT KUB for diagnosis.



2A: A CT KUB is the gold standard investigation for suspected renal tract calculi, and it also gives useful information regarding hydronephrosis. However, if no calculi are seen but there is evidence of obstruction, a contrast CT urogram is performed to try and identify the cause of the obstruction.

3C: A CT urogram can reveal a stricture by showing retained tracer in the pelvis, however, if the cause for the stricture is not clear, the ureter and PUJ can be imaged with a cystoscopic retrograde contrast examination. Alternatively, if the retrograde is not diagnostic, ureteroscopy can be performed.

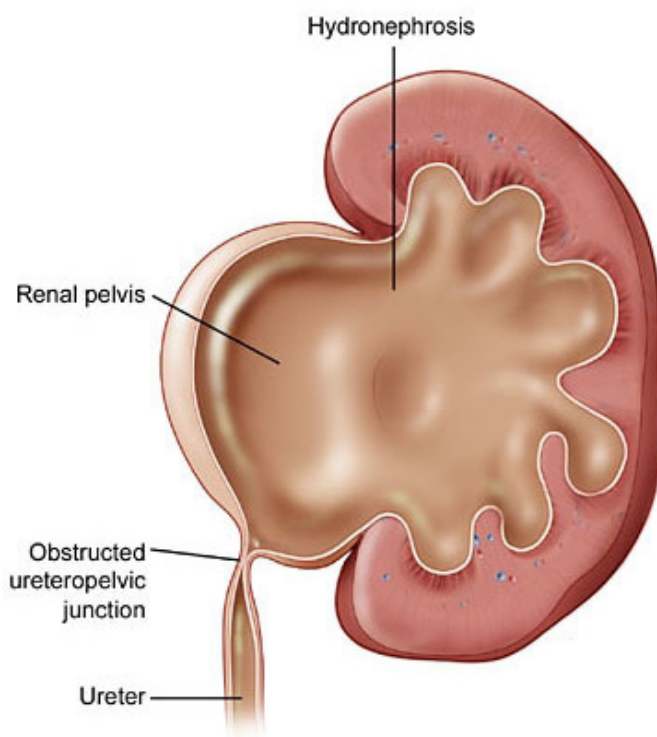
4E: A-D describes causes of PUJO. An adynamic segment of ureter at the PUJ can cause a functional and physiological obstruction. Transitional cell carcinomas are more commonly associated with the bladder; however, may be present at the PUJ and cause obstruction. A calculus can cause direct obstruction or scarring after it has passed or been removed.

A crossing vessel can cause extra-luminal compression although some authorities question whether a crossing vessel directly causes the obstruction or if a dilated pelvis wraps round the vessel thereby giving this impression. Other extra-luminal causes include retroperitoneal fibrosis and compression from surrounding malignant structures. Although prostatic enlargement can cause compression of the lower urinary tract, it causes obstruction distally and has no effect on the PUJ.

5E: Initially, conservative measures must be taken to stabilise the patient with resuscitation. A CT urogram may not be possible with a raised creatinine level in which case a plain CT KUB may be performed to determine the nature of the obstruction. Ultimately this patient needs drainage of the kidney either with a nephrostomy or alternatively, a JJ stent to relieve the obstruction and prevent further renal injury.

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Pelviureteric Junction Obstruction Patient Management

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Financial statement

The authors of this article have not been paid. The Foundation Years Journal is financed by subscriptions and advertising. The Journal does not receive money from any other sources. The decision to accept or refuse this article for publication was free from financial considerations and was solely the responsibility of the Editorial Panel and Editor-in-Chief.

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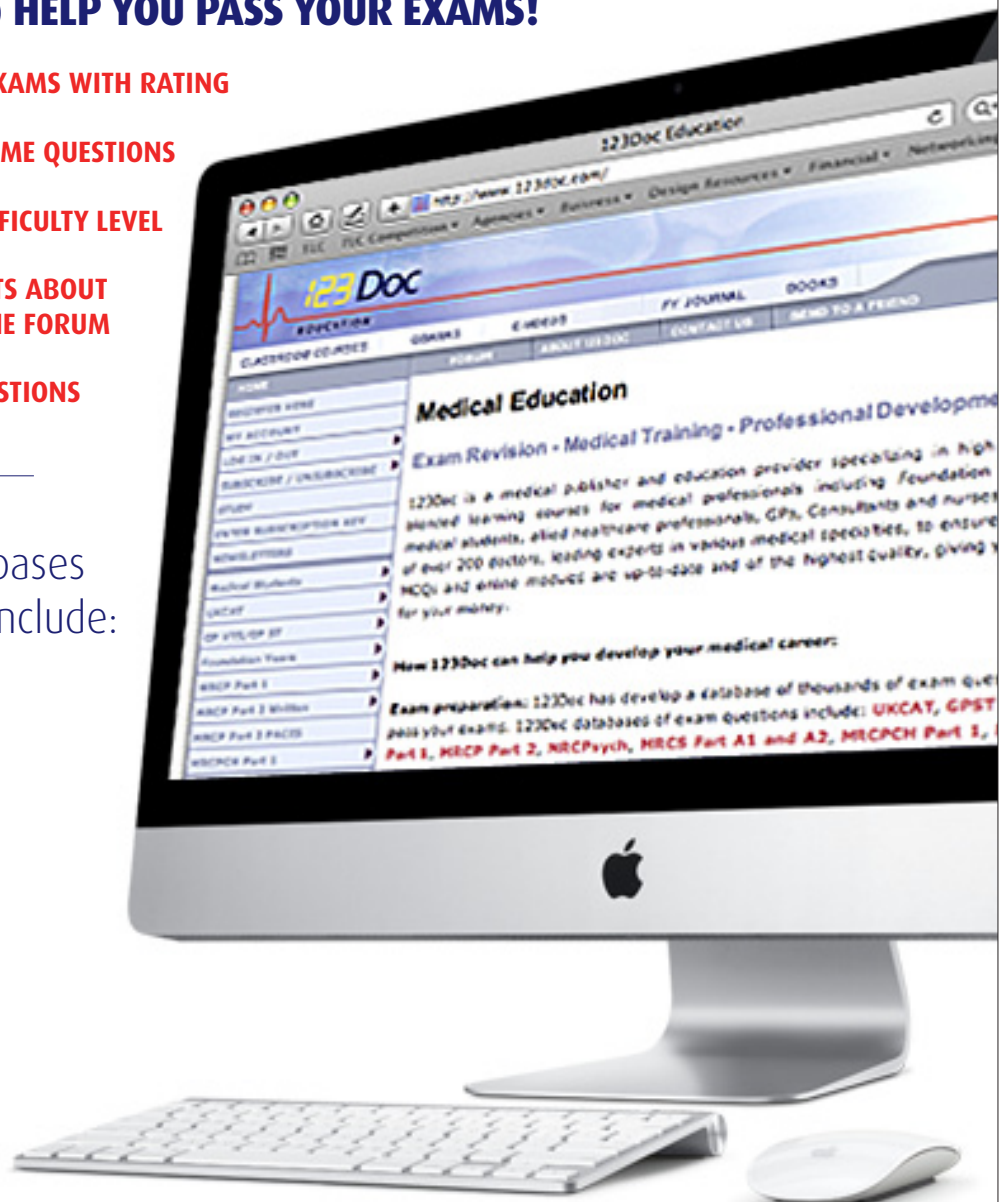
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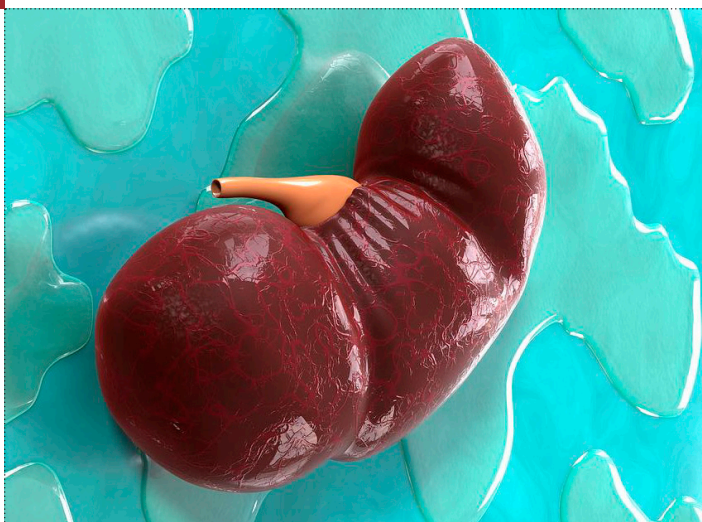
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POST-OBSTRUCTIVE DIURESIS

AP Coupland & CS Biyani



Post-obstructive Diuresis Patient Management

Post-obstructive diuresis

The diagnosis and management of acute urological emergencies forms an important part of urology on-call shifts. Knowledge of such conditions aids the successful diagnosis of the acute surgical patient. This paper discusses the diagnosis and management of post-obstructive diuresis.

Urinary retention is a common acute urological presentation. It can be either acute or chronic. Acute urinary retention is typically a sudden, painful inability to void and is diagnosed with a combination of clinical suspicion and confirming the presence of urine in the bladder. This is done by palpation of the abdomen, to confirm suprapubic fullness which is dull to percussion.

A bladder scan will strengthen the suspicion of urine in the bladder (quantified in millilitres), confirmed by the drainage of urine following urethral or suprapubic catheterisation.

Chronic urinary retention has a more insidious presentation. When taking a clinical history a male patient may report longstanding obstructive symptoms (with or without treatment) such as: urinary frequency, incomplete emptying of the bladder, urinary urgency, nocturia and overflow incontinence. They may report an increase in abdominal girth (trousers do not fit) and other non-specific complaints such as ankle oedema, malaise, weight gain and shortness of breath (1).

Following the successful diagnosis of urinary retention and appropriate catheterisation, it is essential to record the residual volume of urine within the bladder. Urine output should be monitored hourly for evidence of post-obstructive diuresis using an urometer. Please consider the following case.

Abstract

Introduction

This paper discusses the diagnosis and management of post-obstructive diuresis (POD). Knowledge of this condition will improve the clinical management of patients with bladder outflow obstruction in the acute setting.

Case history

We present the clinical case of a 61-year-old man who presented with bladder neck obstruction secondary to metastatic prostate cancer, who subsequently developed POD.

Discussion

We discuss the diagnosis and management of POD from both a pathophysiological and clinical perspective with an emphasis on important definitions and clinical guidance for foundation trainees.

Conclusions

This paper covers a relatively uncommon condition but in understanding its management, the foundation trainee will manage patients with bladder outflow and ureteric obstruction with greater understanding and accuracy.

POST-OBSTRUCTIVE DIURESIS

AP Coupland & CS Biyani



Case history

A 61-year-old male was admitted acutely with urinary retention following a period of haematuria. The haematuria was at first mild but progressed to be much more frank. He had had a long-term catheter in situ which had not drained for a number of hours. He began to complain of increasing lower abdominal discomfort.

He was known to have prostate adenocarcinoma (Gleason 4+3: a histological grading system for prostate cancer. The first score represents the most common grade of prostate cancer in the sample, the second, the highest grade of cancer in the rest of the sample) that had been metastatic at presentation (with spinal metastases) in 2008. He previously had palliative radiotherapy to his spine and left hip and had been commenced on leuprorelin (trade name: Prostag): an LHRH analogue for biochemical castration. In addition, he had previously received 6 cycles of the chemotherapy agent docetaxel and initially had a favourable response.

Unfortunately his prostate cancer had progressed despite biochemical castration and his last prostate specific antigen (PSA) level was 16.2 ng/ml. He was awaiting a channel transurethral resection of the prostate (TURP) for symptomatic relief which had been recently delayed due to uncontrolled hypertension. He lived with his wife, is a non-smoker and drinks only minimal amounts of alcohol on a social basis.

On examination he was in some discomfort at rest and the catheter bag was empty. He had suprapubic tenderness and a dull to percussion, palpable suprapubic mass. A bladder scan demonstrated approximately 900mls in his urinary bladder. Rectal examination revealed an empty rectum and an irregular prostate. The rest of his clinical examination was unremarkable with normal heart sounds and a clear chest with bilateral air entry. His observations were stable and his NEWS score 0.

A diagnosis of acute clot retention (see table 1 for important definitions) was made and a three-way urethral catheter inserted and bladder irrigation commenced. The admission blood results are noted below.

Admission blood results	
Haemoglobin	113 g/L
White blood cells	9.7 10 ⁹ /L
Platelets	215 10 ⁹ /L
Sodium	137 mmol/L
Potassium	4.8 mmol/L
Urea	10.3 mmol/L
Creatinine	240 umol/L
Prothrombin time	10.0 s
C-reactive protein	<5

Figure 1

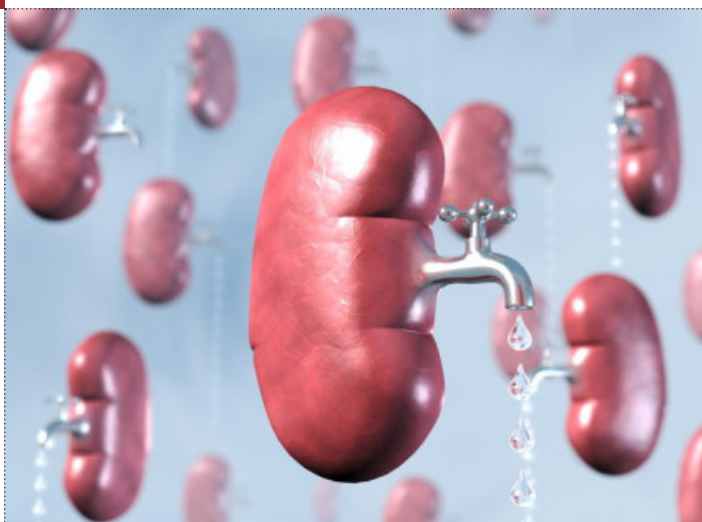
The creatinine had not risen significantly from baseline renal function. His urine output was monitored but unfortunately his urethral catheter was not draining. An ultrasound scan of the kidneys demonstrated bilateral hydronephrosis (figure 4) despite catheterisation and no evidence of ureteric calculi. His repeat blood results revealed an acute kidney injury (see below) and a decision was made to place bilateral nephrostomies and antegrade ureteric stents. This adequately relieved the obstruction.

Blood results admission day 3	
Haemoglobin	101 g/L
White blood cells	5.4 10 ⁹ /L
Platelets	186 10 ⁹ /L
Sodium	136 mmol/L
Potassium	5.1 mmol/L
Urea	14.2 mmol/L
Creatinine	386 umol/L
C-reactive protein	5

Figure 2

POST-OBSTRUCTIVE DIURESIS

AP Coupland & CS Biyani



In the first 24 hours the patient's urine output was 4.2 litres of clear urine. The patient was recognised as having post-operative diuresis. This was managed appropriately with intravenous fluid replacement, daily renal function assessment and regular observations. The patient remained stable and his renal function returned to baseline.

Discussion

Post-obstructive diuresis (POD) is a recognised clinical phenomenon that relates to a period of polyuria and is defined as a urine output equal or greater to 200ml/hr for 12-24 hours or greater than 3 litres per day (1), following the relief of bladder outflow obstruction, bilateral ureteric obstruction (BUO) or obstruction of a solitary kidney (1, 2). It is important to note that bladder outlet obstruction causes significant BUO or obstruction to a single kidney and should also be considered a pathology that may result in POD especially in men secondary to benign prostatic hyperplasia (BPH) or prostate cancer. POD does not typically occur if there is a normal unobstructed contralateral kidney (2), likely due to nephron hypertrophy (3).

The most important aspect of clinical management involves the relief of ureteric or bladder outflow obstruction. In the latter, urethral catheterisation is the most common method. It is important to note that following the relief of urinary retention, rapid bladder decompression reduces pressure and allows filling of the venous system in the bladder mucosa. Such refilling often leads to vessel rupture and subsequent haematuria (1).

Post-obstructive Diuresis Patient Management

It is not necessary to wait 24 hours in order to make the diagnosis of POD. It should be suspected and treated appropriately if urine output exceeds 200ml/hr in the first 2-3 hours (4).

There are 2 broad categories of POD: physiological and pathological.

A physiological diuresis represents a normal physiological response to volume expansion and retained solute during the period of obstruction (2). During this type of diuresis, once excess free water, sodium and urea have been excreted by the kidney the diuresis subsides with the return of homeostasis (2).

A pathological diuresis occurs when the kidney inappropriately handles water or solutes, or both (2). This is caused by an altered medullary solute gradient, signalling and transport pathways (2). Impaired sodium resorption in the thick ascending limb of the loop of Henle leads to a continued diuresis (2). This may result in hypotension due to excess water loss, and electrolyte abnormalities. During obstruction the kidneys attempt to sustain glomerular filtration by keeping the pressure gradient across the glomerulus. This is done by reducing afferent arteriolar resistance which is aided by increased prostaglandin secretion (3). Please see figure 3 for a diagrammatic representation of post-obstructive diuresis.

Clinical management

The clinical management of POD begins with a high clinical suspicion. It is essential to consider the possibility of a patient undergoing diuresis following the relief of bladder outlet obstruction, BUO or obstruction of a single kidney. In the immediate term it is important for the patient to have regular observations and for the urine output to be recorded hourly. Patients should have their renal function and electrolytes checked daily and drink freely (1). All patients who present with acute or chronic urinary retention should have a renal tract ultrasound scan performed to exclude the presence of hydronephrosis.

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In a patient who has POD if their electrolytes, haemodynamic status and mental function remain normal it is likely they have a physiological diuresis that will resolve once excess solutes and water have been excreted. More intensive monitoring is required for those patients in heart failure or those that have poor cognitive function (2). In such cases renal function and electrolytes should be monitored 12 hourly and the urine osmolality should be assessed. Hypo-osmolar urine is indicative of a water diuresis (2).

Those patients that become hypotensive secondary to water loss or have profound electrolyte abnormalities may be undergoing a pathological diuresis and again require close clinical and biochemical monitoring. They will require fluid replacement that corrects electrolyte losses and treats haemodynamic instability until they are clinically stable and renal function and electrolytes return to baseline.

Patients with either a physiological or pathological POD should receive supplemental intravenous fluids. In the stable patient without electrolyte disturbance, a reasonable guide would be to replace the urine output plus 30mls per hour for the first 24 hours. For the second 24 hour period, intravenous fluid should be prescribed at a rate of 50% of urine output. By 72 hours the patient should not normally require any additional intravenous fluid replacement.

In those unstable patients highlighted above, they may require intravenous fluid at a faster rate of replacement (even a fluid challenge if hypotensive) and have electrolytes replaced as appropriate. Note that 5% dextrose should not be used for intravenous replacement as it will only exacerbate the diuresis due to the excess delivery of free water. 0.9% sodium chloride is an appropriate choice.

Once intravenous fluids have been commenced, as clinicians we need a definitive guide to stopping intravenous delivery. This guide is the patient's renal function. Intravenous fluid replacement should be continued until renal function returns to normal (4). If this does not occur the patient may require further investigation in the form of a cystoscopy (4) or CT urogram/CTKUB to further investigate the cause. At the extreme end of the clinical spectrum if renal function does not improve, or worsens despite intervention, dialysis may be required (4).

If an ultrasound scan has been performed during the course of clinical management, especially one that has demonstrated hydronephrosis, it would be prudent to repeat it to confirm resolution prior to discharge.

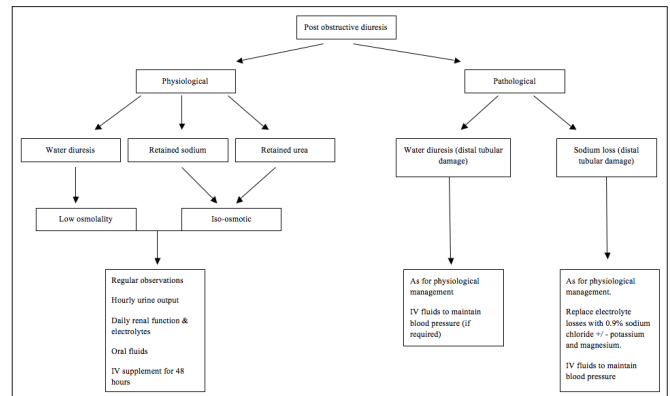


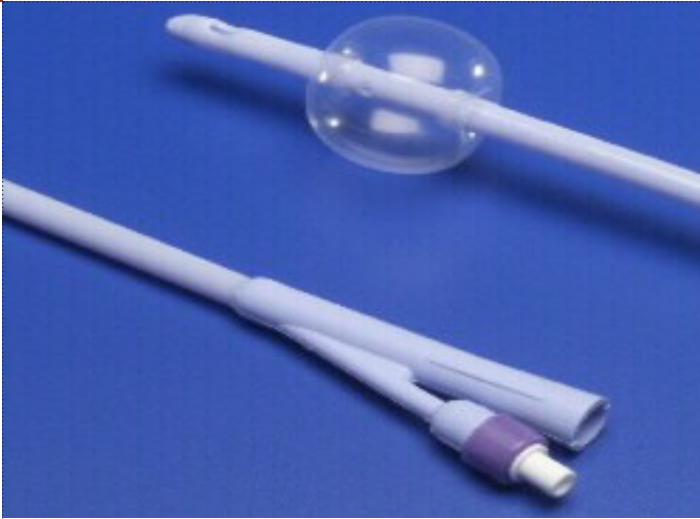
Figure 3: (modified from AUA update series) (1).

Term	Definition
Acute urinary retention	Acute onset of inability to pass urine causing pain secondary to the retention of urine
Clot retention	Urinary retention following a period of haematuria caused by a blood clot obstructing bladder outflow
Chronic urinary retention	An insidious onset of urinary retention caused by the gradual onset of obstructive symptoms, less painful than acute retention and the bladder may hold huge volumes
Three-way urinary catheter	A catheter with an extra lumen that allows irrigation fluid to pass in to and flow out of the bladder. Used in the management of clot retention
Bladder irrigation	The process of passing sodium chloride into the bladder allowing it to dilute clots and flow out of the bladder via the three-way catheter
Hydronephrosis	Descriptive term referring to dilatation of the renal pelvis and calyces whether or not obstruction is the cause of dilatation

Table 1: Important definitions.

POST-OBSTRUCTIVE DIURESIS

AP Coupland & CS Biyani



Key points

- Post-obstructive diuresis may occur following bladder outlet obstruction, bilateral ureteric obstruction or obstruction of a single kidney.
- It is defined as a urine output $>200\text{ml/hr}$ for 12-24 hours or greater than 3L urine output in 24 hours following the relief of obstruction.
- There are 2 main categories of post obstructive diuresis: physiological and pathological.
- Patients with a pathological diuresis require careful monitoring of their clinical observations, mental state and electrolytes.
- Patients with post-obstructive diuresis who are haemodynamically stable should receive IV fluids:
 - 1st 24 hours: urine output plus 30mls/hr
 - 2nd 24 hours: 50% of urine output

Questions

1. Following the relief of BUO or obstruction of a single kidney, what is the definition of post-obstructive diuresis?

- Greater than 1.5L of urine output in 24 hours
- Urine output of greater than 200ml/hr for 12-24 hours
- Urine output greater than 300ml/hr

Post-obstructive Diuresis Patient Management

2. What is the common cause of haematuria following catheterisation for urinary retention?

- Venous vessel rupture
- Haemorrhagic cystitis
- Iatrogenic urinary tract infection
- Bladder neck irritation from the Foley catheter

3. What is the most common imaging technique used to assess the renal tract for a patient admitted in urinary retention?

- CT KUB
- Plain abdominal xray
- X-ray KUB
- Renal ultrasound scan
- CT urogram

4. Which of the following intravenous fluids is not appropriate for the treatment of post-obstructive diuresis?

- 0.9% sodium chloride
- Plasmalyte
- 5% dextrose
- Hartmann's solution

POST-OBSTRUCTIVE DIURESIS

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5. The pathogenesis of post-obstructive diuresis includes all except:

- Inability to maximally concentrate urine, secondary to a decreased medullary concentrating gradient.
- Reduced tubular reabsorption of sodium secondary to altered expression of proximal and distal sodium transporters.
- Increased tubular transit flow time reducing equilibration time for absorption of sodium and water.
- Decreased production of prostaglandins immediately following relief of obstruction.



Figure 4: A renal ultrasound showing hydronephrosis.

Answer

- Answer: b
- Answer: a
- Answer: d
- Answer: c
- Answer: d

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Financial statement

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Patient consent statement

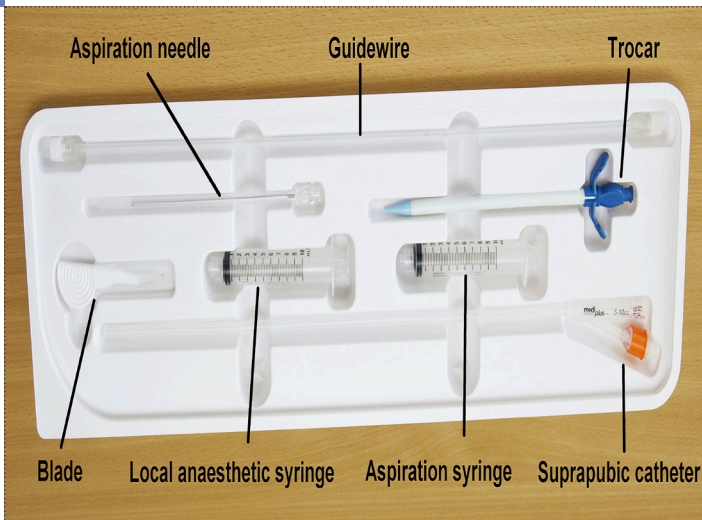
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SUPRAPUBIC CATHETERISATION

CM Devlin & CS Biyani



Suprapubic Catheterisation Practical Procedures

What types of suprapubic catheters are there?

A number of different catheter sets are available; each trust will have one company's set they tend to stock. In general, they are similar to urethral catheters, but they tend to be usually sizes 12 or 16Fr. A normal latex Foley catheter can be used, but, as suprapubic catheters tend to be used for long-term use, silicone catheters are preferred. They can be made from silicone, silicone-elastomer coated latex and hydrophilic polymer. Ensure that you are familiar with the suprapubic catheter set available in your hospital.

Why is it used?

Urethral catheterisation is usually successful and adequate in most instances of acute urinary retention or the need to measure urine output accurately. In the case of the requirement for a long-term catheter, urethral catheters can be appropriate, but consideration may be given to the placement of a suprapubic catheter.

The indications for suprapubic catheter use include:

- To relieve urinary retention when urethral catheterisation has failed.
- When urethral catheterisation is contraindicated e.g. urethral trauma or disruption.
- It is the preferred site for long-term catheters e.g.
 - *Intractable urinary incontinence that is refractory to other treatments.*
 - *Long-term bladder management in spinal injury or MS patients. (1)*

What are the contraindications?

Absolute contraindications

- The absence of an easily palpable or a distended bladder localised by ultrasound.

Abstract

Suprapubic catheters are inserted into the bladder through the abdominal wall. They are usually indicated in cases of failed urethral catheterisation or for long-term catheterisation in certain patient groups. There are a number of techniques of insertion, including the use of a trocar or the Seldinger technique. The most serious complications relating to insertion is the potential for bowel perforation.

Commonly, troubles with changing the catheters can present acutely to urology units. The British Association of Urological Surgeons' (BAUS) guidelines for the insertion, management of complications and the long term follow up of suprapubic catheters, is a useful reference for what can be a daunting clinical situation.

Case study

You are called to the Surgical Assessment Unit to see an 85 year old man with acute urine retention. The patient is known to have a severe urethral stricture, and is awaiting an operation. He informs you that past attempts to insert a catheter have been very painful and unsuccessful. The patient has a temperature of 38.6°C and >900mls shown on a bladder scan. What is required to relieve this patient's retention?

What is a suprapubic catheter?

It is a catheter that transverses the anterior abdominal wall tissues to sit in the bladder. It usually sits 2cm above the pubic symphysis.

SUPRAPUBIC CATHETERISATION

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Relative contraindications

- Patients with lower abdominal incisions or previous pelvic surgery. This increases the potential for bowel to be adherent to the bladder and potentially resulting bowel perforation.
- Pregnancy.
- Known bladder carcinoma.
- Coagulopathy.
- Cross-over vascular graft in the suprapubic region.
- Previous pelvic radiation (risk of adhesions).
- Abdominal wall sepsis (1).

What is the procedure?

There are a number of different methods for the placement of suprapubic catheters. In this article we will look at two.

In general there are a few key points that need to be considered prior to inserting a suprapubic catheter.

1. The benefit to the patient when inserting a suprapubic catheter should outweigh the risk of the procedure.

2. It is essential to obtain appropriate consent with explanation about the risks and evaluate blood results including coagulation profile (2).

3. You should be familiar with the equipment used and what is available in your hospital.

4. You should be competent in performing the procedure if not get a senior to perform/teach you.

5. You should have ultrasound equipment available, if possible, and have experience operating this (2).

The catheter can be placed under local anesthetic infiltration. If there is a risk of autonomic dysreflexia or if the bladder cannot be distended sufficiently, it can be placed under regional or general anaesthesia (1).

New catheter

The technique for the catheter placement will depend on the catheter set that your hospital stocks.

After consent is gained and the equipment checked, you should position the patient supine.

- Palpate or use the ultrasound to locate the distended bladder.
- Clean the skin using appropriate skin prep solution.
- Use a 21G needle to infiltrate local anesthetic and also to aspirate urine.

Trocar Technique

- Aspirate urine with this syringe approximately 2cm above the pubic symphysis giving you a guide as to the angle to insert the trocar.
- Make a 1cm cut in the skin at the puncture site in the mid line.
- Use your dominant hand to push the trocar downwards whilst stabilising it with your other.
- Push in the direction you aspirated urine.
- Once urine comes back, stop pushing, take the trocar out and place the catheter through the sheath.
- Inflate the catheter balloon and peel off the trocar sheath.

Seldinger Technique

Ensure you have the correct equipment - a typical kit should look something like this.



Figure 1: Clean the area of insertion.

SUPRAPUBIC CATHETERISATION

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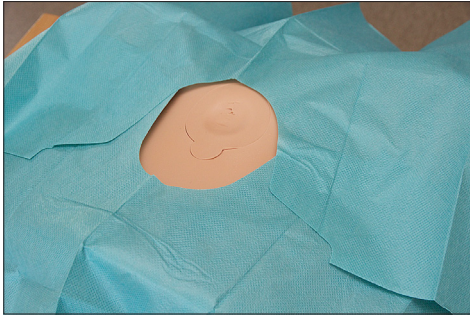


Figure 2: Drape the area correctly.



Figure 3: After infiltration with local anaesthetic, attach a long aspiration needle to a syringe.

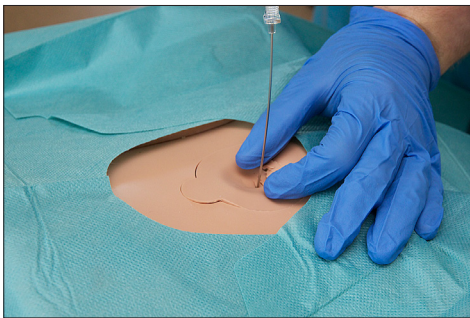


Figure 4: Insert needle at 90 degrees.

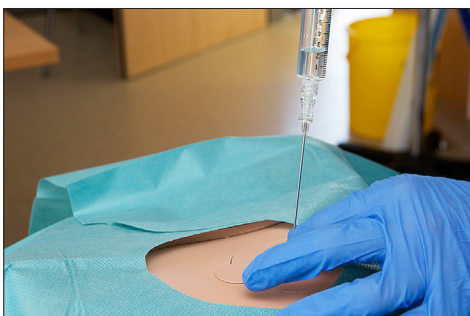


Figure 5: Aspirate urine.



Figure 6: Remove the syringe leaving the needle in place.



Figure 7: Remove the guidewire from its sheath.

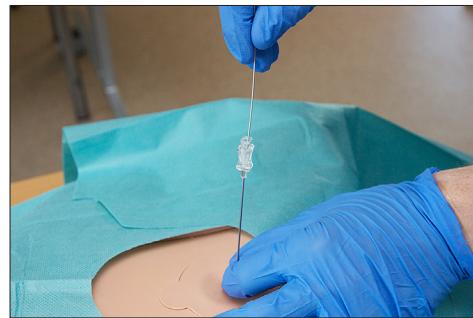


Figure 8: Insert the guidewire into the needle.



Figure 9: Remove the needle, ensuring the guidewire remains in place.

SUPRAPUBIC CATHETERISATION

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Figure 10: Make a 1cm incision next to the guidewire.



Figure 14: Remove the inner sleeve of the trocar.



Figure 11: Remove the trocar from the pack.



Figure 15: Remove the catheter from the pack and insert into the trocar.



Figure 12: Insert the trocar over the guidewire, stabilising with your other hand.



Figure 16: Aspirate urine to confirm correct positioning.



Figure 13: Remove the guidewire, leaving trocar in place.



Figure 17: Inflate the balloon of the catheter.

SUPRAPUBIC CATHETERISATION

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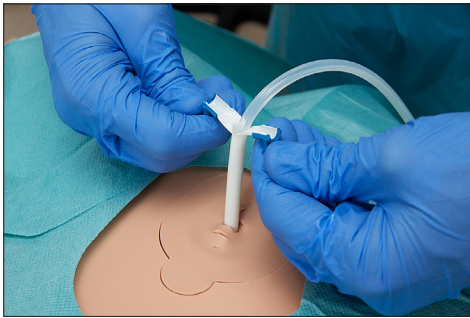


Figure 18: Peel off the trocar sleeve.



Figure 19: Attach the catheter to the appropriate catheter bag or measurement equipment.

Tip: If you are right handed then stand on the left of the patient to make the placement easier.

The initial insertion of suprapubic catheters can take place in a number of different settings, for example acutely on the ward or in A+E. In the operating theatre under cystoscopic guidance is common way to site a suprapubic catheter (3). They can also be placed under ultrasound guidance in the radiology department.

Change of catheter

If a catheter has been in place for a significant amount of time (>6 weeks) then the tract should have matured. This makes changing a catheter relatively easy.

Suprapubic catheter replacement - *Assemble all of the necessary equipment before beginning the procedure. Remove the old dressing and clean the stoma site. Deflate the balloon of the old catheter to remove it. Insert 5-10 ml of lubricant into the suprapubic tract and pass the new catheter immediately.*

When replacing a suprapubic catheter, speed is very important. Do not leave the stoma open for more than 1-2 minutes or it may begin to close. Never remove a suprapubic catheter unless it is going to be changed immediately.

If the catheter has been in less than 6 weeks and/or the patient has been experiencing problems with their catheter you should seek senior advice. The catheter may need to be changed under optical visualisation.

What are the complications?

Suprapubic catheterisation should not be considered a minor procedure. (4) The National Patient Safety Agency reported 3 deaths and 9 bowel perforations. (5)

Early

- Bowel perforation - *this can lead to significant morbidity and even mortality. The patient must be observed or told to look for continuing/worsening lower abdominal pain or general deterioration. Late presentation of bowel injury has been reported.* (6)
- Persistent haematuria - *may require urethral catheter, bladder washout and the pulling the suprapubic catheter balloon back onto the bladder wall to tamponade the bleeding.* (1)
- Wound infection - *discuss with a senior about the need for antibiotic use.*

Delayed

- Recurrent UTIs - *as the catheter is a foreign body there may be colonisation of the urine with bacteria, but not necessarily an active infection.*
- Catheter blockages - *due to encrustation of the catheter.*
- Formation of bladder stones.
- Difficult catheter changes - *may need admission to hospital to re-site.*
- Bypassing of the catheter - *secondary to blockage or bladder over activity.*

Follow up management

The first catheter change is usually reserved for 6-12 weeks to allow the tract to mature (1). There is no set date on which they must be changed, but it usually between 6 weeks to 3 months.

The BAUS guidelines (see below) nicely outline how these catheters should be managed. They advise immediate access to a urology unit for a failed catheter change and also recommend cystoscopic investigation in repeated catheter blockages. (2)

Are there any guidelines for suprapubic catheters?

The most recent BAUS guidelines were written in 2011 (2). They set out useful guidance on how best approach suprapubic catheters and the problems encountered with them. In addition, The European Association of Urology Nurses (EAUN) also published their recommendations. (7)

Conclusion

Suprapubic catheters can seem to be more daunting to deal with compared with urethral catheters, however with understanding the principles and seeking advice they should not cause problems.

It is important to know the indications for suprapubic catheterisation and the appreciation of the risks involved. It is recommended that you look at your local trusts' policy on their insertion and what kits are available.

If you are required to change a blocked suprapubic catheter, or are having difficulty in replacing one, then the placement of a urethral catheter can be used in order to make the bladder safe.

SUPRAPUBIC CATHETERISATION

CM Devlin & CS Biyani

Questions

1. What is the normal material suprapubic catheters are made from?

- Silicone
- Latex
- PVP rubber
- Hydrophilic polymer
- Polytetrafluoroethylene PTFE (Teflon) coated latex

2. What are the relative contraindication(s) for suprapubic catheterisation?

- The inability to palpate or detect a distended bladder on USS
- Pregnancy
- Patient on warfarin
- Urothelial bladder cancer
- Bladder volume 400 ml on a bladder scan

3. What are the complication(s) related to suprapubic catheter insertion?

- Persistent haematuria
- Epididymitis
- Bowel perforation and peritonitis
- Traumatic hypospadias
- Repeated blocked catheters

4. How often should suprapubic catheters be changed?

- 6 months
- 1 month
- Usually 6 weeks to 3 months.
- 4 months
- 2 weeks

Answers

1: A, D**2: B, C, D****3: A, C, E****4: C**

Acknowledgements

Adam Smith

Technical Skills & Media Coordinator
Mid - Yorkshire NHS trust for taking the photos
of the Selindger suprapubic technique.

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CASE BASED DISCUSSION ON STRESS URINARY INCONTINENCE IN WOMEN

V Revicky & TR Terry



Case based discussion on stress urinary incontinence in women Patient Management

Her urine dip-stick test was normal and her post-void residual bladder volume was 50 mls. A voiding diary did not suggest an overactive bladder. Following the National Institute for Health and Care Excellence (NICE) guidelines, she was referred for a pelvic floor muscle training (PFMT), but after 3 months, her SUI had not improved. Urodynamic studies were performed, which confirmed SUI. She was counseled about a tension free vaginal tape procedure (TVT), which was subsequently performed successfully.

Abstract

This case based discussion presents the case of stress urinary incontinence (SUI) in a woman and describes the presentation, clinical history, investigations and treatment for this condition. Good clinical care and patient management parts of the Foundation programme curriculum are covered in this article. The article also discusses different types of continence surgery and potential complications as well as the current controversies surrounding the use of vaginal mesh in urogynaecological surgery.

Case history

A forty eight year old woman was referred to a tertiary urogynaecological clinic by her general practitioner with a one year history of leakage of urine whilst exercising, requiring two pads for containment per day. Her general health was good, she regularly exercised, and her body mass index was 28. Her past surgical history included a vaginal hysterectomy and anterior vaginal wall repair at the age of forty two for a troublesome utero-vaginal prolapse.

She made an uneventful recovery from this surgery. Her obstetric history included two children, both delivered vaginally by forceps. She sustained an anal sphincter injury during her first delivery, but she recovered from this injury without any long term consequences. At her visit to the urogynaecological clinic, she gave a urine sample for analysis and a residual urine bladder scan was performed. Her consultation included a full clinical, drug and social history. Clinical examination included both a general physical examination and a focused ex-amination of the abdomen and pelvis.

A chaperoned digital and speculum examination of the vagina were performed with the patient lying supine. The speculum examination revealed a mild anterior vaginal wall prolapse with no vaginal vault or posterior vaginal wall prolapse. When she was asked to cough, she had an obvious urethral leakage of urine, with no further descent of anterior vaginal wall and a good pelvic floor muscle contraction.

Discussion

The International Continence Society defines urinary incontinence as any involuntary leakage of urine. Involuntary urine leakage on effort or exertion, sneezing or coughing is defined as SUI, whereas involuntary urine leakage accompanied or immediately preceded by urgency is referred to as an urge urinary incontinence (UUI) (1).

Not infrequently, both types of incontinence may coexist. Most patients can be diag-nosed by their symptoms alone and information from a bladder diary gives useful information. In the presence of SUI alone, patients can be offered PFMT immediately (2). A vaginal examination allows the clinician to rule out utero-vaginal prolapse, and helps to decide if prolapse surgery might be necessary in its own right. A urine dip-stick test is usually negative but may reveal the presence of microhaematuria, glycosuria or proteinuria. Clearly, each of these findings requires further investigations. Nitrites and leucocytes signify the possibility of a urinary tract infection (UTI) whose symptoms are similar to those of UUI with urgency and frequency of urination. Complicated vaginal births with forceps deliveries may be associated with the development of SUI. Urodynamic testing not only allows a confident diagnosis of SUI but is also helpful in excluding concomitant UUI (3).

NICE recommends urodynamic assessment prior to primary SUI surgery in those women who have coexisting symptoms of UUI or voiding difficulties (incomplete emptying). NICE also recommends urodynamic testing when previous SUI surgery has failed. Urodynamic test measures intra-vesical pressure (detrusor pressure plus intra-abdominal pressure) via a urethral catheter using a multi-channel recorder. The recorder also simultaneously measures intra-abdominal pressure using a rectal catheter. By serial subtraction from the outputs of these two pressure lines, a print out of detrusor pressure is produced. The presence of urinary incontinence in the absence of raised detrusor pressure during coughing indicates SUI.

CASE BASED DISCUSSION ON STRESS URINARY INCONTINENCE IN WOMEN

V Revicky & TR Terry

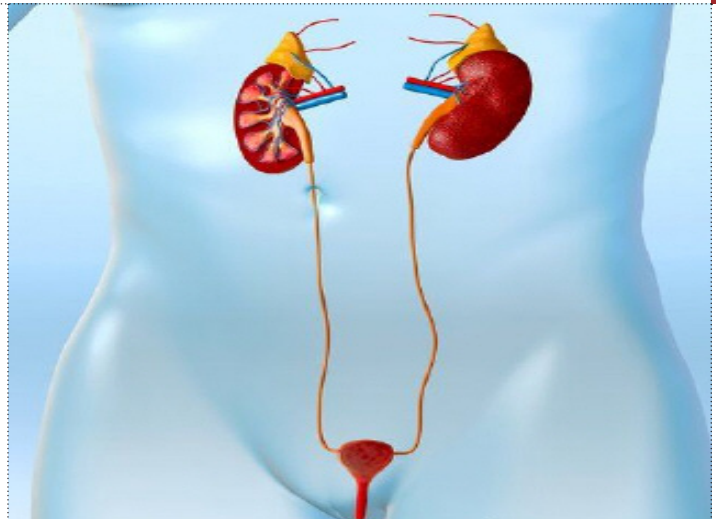
PFMT is effective in reducing SUI symptoms with a subjective cure rate from 16 to 56% (4). When PFMT fails and the patient is sufficiently bothered by her SUI, a mid urethral tape operation either as a TVT or a transobturator tape (TOT) are offered. Both tapes provide a tension-free support to the mid-urethra, preventing downward displacement during coughing or exertion.

The TVT was first introduced into clinical practice in 1996 by Ulmsten et al (5). The TVT requires the passage of the tape through a single vaginal incision underneath and around both sides of the mid-urethra, passing retropubically in a 'U' shape. The tape exits via two skin incisions in the supra-pubic area just lateral to the pubic tubercles. The TOT has a similar course but traverses laterally through the obturator foramen and out through two groin incisions.

A more invasive operation is the Burch colposuspension, which was used almost exclusively prior the introduction of mid urethral tape surgery. The Burch procedure requires a lower mid-line laparotomy or Pfannenstiel incision to access the retropubic space. The bladder base is then supported by elevating and suturing the anterior vaginal wall to the pectineal ligament. The efficacy of the Burch colposuspension is mirrored by the lesser invasive mid-urethral tape operations and the latter may be performed as day case surgery (3). It is not surprising then that the Burch colposuspension is rarely used currently.

The continence rate following a mid-urethral tape operation is reported between 74%-95% for up to 2 years of follow up and in a range of 56% -85% at 10 years (3). Bladder injury with TVT trocar is reported in 3%-6% cases and urinary retention following TVT is reported in up to 13% of patients (3). A new onset of symptoms of urgency, frequency and nocturia is reported in up to 25% of patients following the TVT procedure probably due to the tape producing an element of outflow obstruction (3). All of these complications are much rarer with the TOT (6).

A further complication of both mid-urethral tapes is tape erosion through the vaginal skin (up to 4% of patients) (3). Rarely, the placement of the TVT trocar may injure bowel (0.03% - 0.7%) (7). There is not enough evidence to comment on the rate of mesh related pain symptoms with the TVT but this does feature more commonly with the TOT mesh as the tape emerges through the adductor muscles via the obturator foramen (8). The TOT may be either passed from within the vagina out through the obturator foramen when it is designated the TVT-O procedure or using the outside-in approach, when the tape is passed from the groin below the adductor tendon and through the obturator foramen into the vagina. Numerous uncontrolled studies have published outcomes on TVTs and TOTs but there are few randomised prospective studies.



A systematic review of the literature identified eleven randomised controlled trials containing 1261 women (6). A meta-analysis of these compared TVT with TVT-O and outside-in TOT and demonstrated that subjective cure rates at 2-12 months were the same for all procedures. However, bladder injuries were eight times more common and voiding difficulties were twice as common after TVT in comparison to TOT (6). Against the TOT option was the incidence of groin or thigh pain which was eight times more common versus the TVT procedure (8).

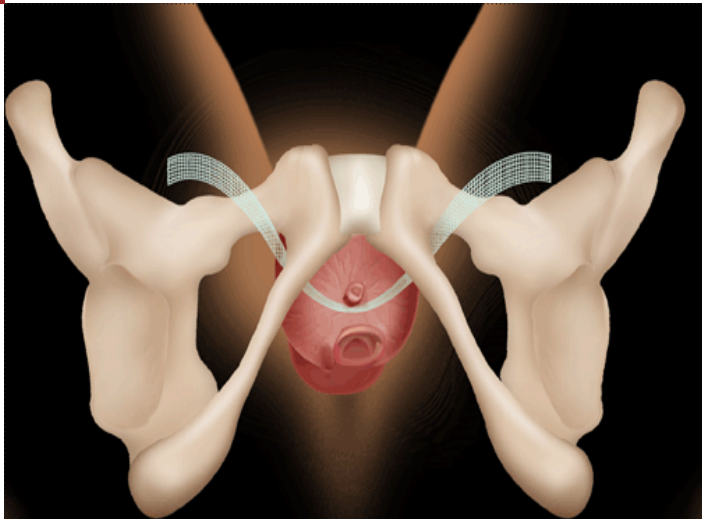
Additionally, mesh erosion was twice as common after TOT. A further study compared TVT-O with outside-in TOT and reported equivalent cure rates (9). Recently, single incision tapes have been introduced, where the vaginal tape is inserted via a single vaginal incision but there are no exit wounds. Studies comparing these novel single incision tapes with TVT and TVT-O cohorts, showed a higher failure rate of the single incision tape to cure SUI at 6 weeks and 6 months (10,11,12). The reason for the development of the single incision tape was to assess whether it would be associated with less morbidity and faster recovery than the TVT, TOT and TVT-O tapes.

Post TVT or TOT follow ups are usually arranged at six to eight weeks. Patients are examined to rule out vaginal tape erosions and are given validated questionnaires to assess the benefits for the surgery.

National recommendations now state that mid urethral tape surgery should only be performed by surgeons performing at least 20 cases per year and that patient outcomes should be entered into national data bases (3). The reason for this is the public concern arising from the morbidity associated with the use of synthetic meshes in the repair of genitourinary prolapse conditions. Indeed, the Scottish Health Board recently decided to temporarily ban the use of transvaginal polypropylene mesh implants used as a treatment for pelvic organ prolapse and has called for a review of TVT used to treat SUI.

CASE BASED DISCUSSION ON STRESS URINARY INCONTINENCE IN WOMEN

V Revicky & TR Terry



In order to allay these concerns, the British Society of Urogynaecology (BSUG) has indicated it will audit all mid urethral tape surgeries performed for SUI in the UK into a mandatory national clinical audit for the 2014 Consultant Outcomes Publication (COP) process. All surgeons, both gynaecologists and urologists, carrying out SUI surgery in England will be expected to report their personal outcomes for this surgery for the period of 1st January 2013 to 31st December 2013, which will then be analysed and published in October 2014.

Test yourself section (best of 5 MCQs)

1. Stress urinary incontinence is:

1. Involuntary urine leakage on effort or exertion or on sneezing or coughing
2. Involuntary urine leakage accompanied or immediately preceded by urgency, which is a sudden compelling desire to urinate that is difficult to defer
3. Continuous loss of urine
4. Post-micturition dribbling of urine
5. Overflow urinary incontinence

2. First line of treatment for stress urinary incontinence is:

1. Pelvic floor muscle training
2. Botulinum toxin A bladder injections
3. Tension free vaginal tape
4. Neurostimulation
5. Anticholinergics

Case based discussion on stress urinary incontinence in women Patient Management

3. Continence rate up to 2 years following TVT is reported in a range of:

1. 74%-95%
2. 60%-75%
3. 50%-60%
4. more than 95%
5. Data still not available

4. The most common complication of TVT surgery is:

1. Bladder injury
2. Bowel injury
3. Mesh erosion
4. Urgency and frequency of urination
5. Urinary retention

5. Which type of continence surgery is associated with the highest rate of thigh or groin pain?

1. TVT
2. TOT
3. Single incision vaginal tapes
4. Burch colposuspension
5. None of above

CASE BASED DISCUSSION ON STRESS URINARY INCONTINENCE IN WOMEN

V Revicky & TR Terry

Answer

1. Correct answer: 1

The International Continence Society defines urinary incontinence SUI as the complaint of any involuntary urine leakage on effort or exertion or on sneezing or coughing.

2. Correct answer: 1

Pelvic floor muscle training is effective in reducing SUI symptoms, with subjective cure rate from 16 to 56% and does not have risks of surgical treatment.

3. Correct answer: 1

Continence rate following TVT is reported in the range of 74%–95% up to 2 years of follow up.

4. Correct answer: 4

The incidence of a bladder injury with TVT procedure is reported in the range of 3%–6%. Urinary retention following TVT is reported in range of 0%–13% of patients up to 10 years of follow up. The new onset of symptoms of urgency, frequency, nocturia is reported in range of 0–25% of patients following TVT procedure. A rare complication of TVT is tape erosion through the vaginal skin and is reported in range of 0%–4% of patients. Bowel injury was reported between 0.03%–0.7%.

5. Correct answer: 2

TOT.

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Financial statement

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UTI: IT'S COMPLICATED

F Burge & K Anantharamkrishnan



UTI: It's Complicated Patient Management

The intention of this review is to give Foundation Doctors the tools to recognise and treat UTIs, to give guidance as to length of treatment and which patients to refer to the Urology team. Every hospital and primary care trust should have antibiotic guidelines based on local incidence and virulence of microorganisms therefore specific antibiotic regimens are not suggested in this article.

The following article is separated into specialties within the Foundation programme. Uncomplicated UTIs suitable to be treated in Primary Care are covered first followed by UTIs requiring an acute medical admission, special considerations in Obstetric and Gynaecological patients, Paediatric UTIs and infections presenting to the General Surgical and Urological take.

A number of definitions are worth considering before focusing on the UTI's

UTI: *The inflammatory response of urothelium to invasion by bacteria.*

Bacteriuria: *Confirmation of bacteria in the urine based on microscopy and culture. Bacteriuria can be asymptomatic or symptomatic. Bacteriuria in the absence of symptoms and leucocytes may indicate a contaminated specimen.*

Pyuria: *The presence of white cells in the urine. If there is no associated bacteriuria it is referred to as 'sterile pyuria' and conditions such as TB, bladder cancer or stones should be sought.*

Uncomplicated UTI: *Cystitis or pyelonephritis in an individual with no complicating factors.*

Complicated UTI: *Infection in an individual with a structurally or functionally abnormal renal tract, renal disease or comorbidity that infers greater risk of an adverse outcome. (See Table 1 for examples).*

Recurrent UTI: *>2 UTIs in 6 months or >3 in a year.*

Abstract

Introduction

Urinary Tract Infections (UTIs) are common and are encountered in almost all fields of medicine. Evidence based treatment of infections is essential to limit the emergence of resistant strains of bacteria. Foundation doctors will be involved with treatment of UTI's in their first years of practice.

Methods

European Association of Urology and NICE Guidelines were reviewed and consolidated to provide up to date recommendations.

Conclusion

Prompt investigation, treatment and referral for Urological intervention in accordance with up to date evidence should help to reduce the morbidity of UTIs and help prevent bacterial resistance.

Introduction

Urinary tract infections (UTIs) account for approximately 15% of antibiotics prescribed in the community (1) and 40% of nosocomial infections (2).

Bacterial resistance is increasing and lack of effective antibiotics may prove to be one of the major challenges the medical profession faces in the future. It is therefore important to treat UTI's according to a sound evidence base to prevent inappropriate use of antibiotics which promotes bacterial resistance.

UTI: IT'S COMPLICATED

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Structural Abnormality
<ul style="list-style-type: none"> • Indwelling catheter, stent or nephrostomy • Bladder outflow obstruction • Upper tract obstruction (pelvi-ureteric junction obstruction (PUJO), stricture, stone) • Medullary sponge kidney, polycystic kidney disease • Bladder augmentation, orthotopic bladder, diverticulum, tumour
Functional Abnormality
<ul style="list-style-type: none"> • Vesico ureteric reflux • Detrusor failure • Detrusor sphincter dyssynergia (spinal cord injury) • Hydroureter of pregnancy
Host Factors
<ul style="list-style-type: none"> • Diabetes • Renal insufficiency • Immunosuppression

Table 1: Examples of factors causing 'complicated' UTIs.

Primary care

Uncomplicated cystitis and pyelonephritis

Commonly affects young women. The causative organism is usually *E.coli* (70-95%) (3).

Typical symptoms of cystitis include dysuria, frequency and urgency. If urinalysis confirms leucocytes and nitrites and the patient has no risk factors for a complicated UTI, a short course of antibiotics (3-5 days) is adequate. A culture should be sent if the symptoms do not resolve.

Fever and loin pain indicate pyelonephritis. Following urine culture, treat with first line oral antibiotics for 10-14 days. Check the culture to ensure an appropriate choice of antibiotic has been used.

Patients should be given conservative advice to prevent further infection. This includes:

- Keeping well hydrated
 - Avoiding constipation
 - Wiping the perineum 'front to back'
 - Voiding before and after intercourse
 - Taking cranberry tablets or juice (4)
 - Avoiding the use of spermicides (5)
- (these reduce lactobacilli and enhance adherence of *E.coli*)

Catheters in the community

Regular catheter changes under sterile conditions prevent blockages and help reduce the number of infections. Antibiotic and silver coated catheters are available and slow the rate of colonization of the catheter. They do not reduce the rate of infection nor does regular antibiotic bladder washes and hence neither are recommended (6).

Who to refer from primary care

Acute medical admission

- Uncomplicated pyelonephritis with vomiting – for parenteral antibiotics.

Acute Urological admission

- Patients with infection and strong suspicion of obstruction (unable to pass urine; palpable bladder; symptoms suggestive of ureteric colic).

Outpatient Urology referral

- Men – for evaluation of their renal tract and bladder emptying.
- Patients with 'complicated' infections.
- Patients with recurrent uncomplicated infections despite conservative advice.
- Any patient with associated visible haematuria (VH) at the time of infection or persistent non-visible haematuria (NVH) following treatment. This is particularly important in the elderly as bladder cancer can present as UTIs.

Medicine

Pyelonephritis

Patients requiring parenteral antibiotics can be converted to oral once the vomiting and pyrexia have settled. If the patient is septic, upper tract obstruction should be excluded urgently with ultrasound (USS). If the pyrexia doesn't settle, cultures and antibiotics should be reviewed to exclude the presence of a resistant bacterium. A 'swinging' pyrexia may indicate the development of an abscess which can be seen on USS and requires drainage.

Catheter related infections

Many elderly patients have long-term indwelling catheters. It can be difficult to diagnose a UTI in a catheterised patient. Typical cystitis symptoms may not feature, but non-specific symptoms of general malaise, suprapubic pain or offensive-smelling urine may predominate.

Interpretation of urinalysis, microscopy and culture is harder because 100% of patients who have had catheters in for >30 days have bacteriuria (6). Asymptomatic bacteriuria in a catheterised patient does not require treatment.

Changing the catheter during treatment of a catheter related UTI may help if the catheter has been indwelling for more than 7 days (6).

UTI: IT'S COMPLICATED

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Diabetes and UTI

Diabetic patients are more prone to rapidly progressive parenchymal infections and are at greater risk of complications such as renal scarring or abscess formation.

Although asymptomatic bacteriuria is more common in diabetics (up to 26% in diabetic women) (7) a randomized controlled trial has shown no reduction in symptomatic episodes or hospital admissions if this condition is routinely screened for and treated (8).

Causative organisms differ from those in non-diabetics. Fungal infections are more common. Diabetics are at risk of emphysematous pyelonephritis, a rare, but particularly severe infection caused by gas-forming organisms (Figure 1). This condition requires prompt treatment in line with sepsis guidelines and may need critical care input.



Figure 1: A coronal CT showing air in the right renal parenchyma and pelvis of a diabetic patient with emphysematous pyelonephritis and medullary sponge kidney.

UTI: It's Complicated Patient Management

Neurology

The nervous control of bladder storage and voiding is very complex. A number of conditions can impair bladder emptying and increase the risk of infection. MS, Spinal cord injury, stroke and diabetic autonomic neuropathy are common examples. Referral to Urology for urodynamic assessment (bladder pressure studies) is necessary to evaluate the detrusor muscle and sphincter mechanisms to initiate treatment aimed at improving bladder emptying.

Renal failure and UTI

Acute renal impairment may be pre-renal due to dehydration or poor perfusion as a result of sepsis however, post renal obstruction should be considered and excluded with an urgent USS. If upper tract obstruction is found, the case should be discussed immediately with an Urologist for consideration of further imaging and urgent decompression (usually with a nephrostomy). If the patient is in retention a catheter should be inserted.

Chronic kidney disease (CKD) reduces the antibacterial properties of urine – the pH is higher and the osmolality is less. Uraemia can impair host defenses further by impeding uroepithelial mucus production (9), making CKD patients more susceptible to UTIs.

In renal failure avoid nephrotoxic antibiotics and consider dose reduction if the eGFR is <30 mL/min. Patients receiving renal replacement therapy may need their antibiotic doses or timings adjusted according to their treatment schedule. In this situation, advice from the renal physicians or pharmacists should be sought.

Renal transplant

Bacteriuria and UTIs are common in renal transplant recipients. Prophylactic antibiotics are recommended at the time of surgery and for six months post-operatively (10).

Treatment of symptomatic infection requires a longer course (10 - 14 days). As transplant recipients are immunocompromised, antifungals may need to be added.

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Immunosuppression

Patients with HIV are more prone to less common viral and fungal and bacterial infections such as cytomegalovirus, aspergillous and Tuberculosis mycobacterium respectively. Patients develop bacteriuria when their CD4 count is low but do not require treatment unless symptomatic (11).

Investigation and treatment of UTIs in HIV patients are best co-managed with the infectious diseases unit.

Who to refer

Urology inpatient referral

Sepsis with upper tract obstruction and or renal abscess – require urgent drainage. Discuss with urology team immediately.

Urology outpatient referral

Patients with recurrent UTIs and complicating factors other than obstruction.

Obstetrics & Gynaecology

Pregnancy

The gravid uterus can prevent adequate bladder emptying. Increased levels of progesterone can cause physiological 'hydroureter of pregnancy' (12). Because of this, asymptomatic bacteriuria is more likely to progress to pyelonephritis in pregnant women (up to 30%) (13). Pyelonephritis in pregnancy can result in fetal growth retardation and preterm labor. Therefore asymptomatic bacteriuria is screened for in the first trimester and treated if found (13).

Repeat cultures following antibiotics are required to ensure treatment has been adequate.

Penicillins and cephalosporins are suitable for use in pregnancy and during breast feeding. Trimethoprim should be avoided in the first trimester and nitrofurantoin should be avoided at term. Sulphonamides and quinolones should be avoided (14) throughout pregnancy. Cefalexin and Nitrofurantoin are commonly used for prophylaxis against recurrent UTIs in pregnancy.

The presence of group B streptococci in the urine is an indication for prophylactic antibiotics during labour due to its association with neonatal sepsis (15).

Postmenopausal women

Reduced mobility, poor bladder emptying and catheters increase the risk of UTIs in elderly women. Post menopausal reduction in oestrogen levels reduce the number of naturally occurring lactobacilli in the vagina enabling pathogens to colonise, predisposing to UTIs. A cystocele can impair bladder emptying and should be sought with a speculum examination of the vagina.

Treatment is according to symptoms, culture and sensitivity. Vaginal oestrogen can be administered for prevention of UTIs but is not universally effective (16). Asymptomatic bacteriuria does not require treatment (17).

Who to refer

Urology inpatient referral

Pregnant women with pyelonephritis and upper tract obstruction.

Urology outpatient referral

Recurrent UTI in post menopausal women.

Paediatrics

UTIs are the most common bacterial infection in children <2 years. In neonates UTIs can be complicated by bacteremia.

In the first 3 months of life uncircumcised boys are more prone to infection than girls but this trend is reversed by school age (18).

Whilst older children may complain of cystitis symptoms or flank pain, young children may show signs of frequency of micturition, offensive smelling urine, new enuresis, fever, poor appetite or failure to thrive.

Prompt investigation to rule out any anatomical or neurological abnormality is essential to reduce the chance of infection and renal scarring and prevent long-term complications such as hypertension and renal impairment (19).

Abdominal examination is performed to exclude pain, constipation and retention. The back should be examined for evidence of neurological conditions preventing bladder emptying eg spinabifida or spinal agenesis, and the genitalia for phimosis, balanitis, vulval adhesions or orchitis.

Urine samples can be difficult to obtain. Young children may require a clean catch or a suprapubic aspirate (following USS to confirm presence of urine).

An USS is recommended for any febrile UTI in a child. Other imaging includes a micturating cystourethrogram which is used to diagnose vesicoureteric reflux and a Dimercaptosuccinic acid scan which is used to investigate for renal scarring and function. The indication to perform further imaging is based upon the USS results, the nature of the UTI (eg recurrent or atypical) and the age of the child (children <3 months are more intensively investigated).

The full recommendations can be found in the NICE guidelines (20).

UTI: IT'S COMPLICATED

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Who to refer

Inpatient urology referral

Febrile UTI and functional or anatomical abnormality requiring urgent drainage of renal tract.

Outpatient urology referral

- Recurrent balanitis or cystitis and phimosis – for consideration of circumcision.
- VUR and breakthrough infections whilst on prophylactic antibiotics – for consideration of peri-ureteric bulking agents or reimplantation.
- Neurological conditions causing poor bladder emptying – needs combined treatment with paediatric Urologists and Neurologists.

General surgery / urology acute admissions

Epididymitis and orchitis

Most orchitis is secondary to ascending urethral or bladder infections causing acute epididymo-orchitis. Consider chlamydia or gonorrhoea (21) as the causative organism in younger, sexually active men and common uropathogens such as E.coli in more elderly gentlemen with poor bladder emptying.

The most important differential diagnosis is testicular torsion. In general, patients with orchitis tend to be older, the onset is less acute and the pain gradually worsens. There may also be a history of cystitis symptoms or systemic signs of infection such as pyrexia. On examination the scrotal skin is usually erythematous and oedematous.

It is usually less tender to examine an infected testicle than a torsed testicle and elevating the infected testicle can alleviate the pain (Phren's sign). USS with colour doppler can be used to look for blood flow in the cord (22).

UTI: It's Complicated Patient Management

However, if there is suspicion of torsion, immediate scrotal exploration remains the gold standard investigation and should not be delayed by waiting for imaging.

Orchitis requires 10-14 days of antibiotics. If there is no improvement in symptoms or the patient remains febrile an USS of the scrotum should be performed. If an abscess is found this requires surgical drainage.

Following treatment of the acute infection the patients need to be investigated for the cause of the infection.

Fourniers gangrene

This urological emergency is a necrotizing fasciitis of the external genitalia and perineum caused by aerobic and anaerobic organisms growing synergistically. Wheelchair bound or sedentary patients coupled with risk factors of immune-compromise, trauma or perianal infection are most at risk. Patients often appear more unwell than their clinical findings perhaps suggest they should be. There can be signs of surgical emphysema and skin necrosis but, because the infection spreads along the fascial planes, the tissue necrosis can be far more widespread than it appears.

Aggressive fluid resuscitation and broadspectrum antibiotics to cover gram positive and negative aerobes and anaerobes should be given. Critical care should be informed and the patient prepared for surgical debridement as soon as possible. All necrotic tissue should be removed and samples should be sent to microbiology. This often involves the scrotal skin and can involve the anterior abdominal wall. As most of the testicular blood supply originates from the aorta the testicles can usually be salvaged. Subsequent antibiotic treatment is guided by culture results and clinical progress. Microbiology advice is essential. Despite expeditious treatment the mortality is approximately 40% (23).

UTI associated with obstruction

Patients with an infected obstructed kidney become very unwell very quickly and are a urological emergency. Urgent decompression is usually achieved by insertion of a nephrostomy into the renal pelvis by the radiologists. This is performed under local anaesthetic. It is worth noting that following nephrostomy insertion patients can temporarily become more septic and need close observation and early critical care input if required.

UTI: IT'S COMPLICATED

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Urology outpatient conditions

Recurrent UTI

Investigations for recurrent infections are focused upon identifying structural or functional abnormalities that can be treated. Patients should have an X-ray and USS to exclude stones, upper tract obstruction and incomplete bladder emptying. Any patients with VH and patients >40yrs with persistent NVH should have a cystoscopy to exclude bladder cancer. If there is a suspicion of an underlying neurological condition urodynamic evaluation may be necessary.

If no structural or functional abnormalities are found, prophylactic antibiotics may be tried. These can be given as a daily low dose, post-coital or self start prescription according to the frequency and pattern of infection and patient preference. It is very important that the patient gives a sample of urine before starting antibiotics if they have any breakthrough infections.

UTI and incomplete bladder emptying

The majority of these patients will be men. Obstructive lower urinary tract symptoms (LUTS) include hesitancy, poor stream, intermittent flow, terminal dribbling, feeling of incomplete emptying and nocturia. Examination of the prostate to estimate size, a flow test and post void residual volume can be measured in clinic to objectively measure bladder emptying. UTIs and poor bladder emptying due to prostatic obstruction is an indication for a TURP. Women need to be examined for a cystocele which can impair bladder emptying.

A small number of patients will have detrusor failure or neurological conditions preventing bladder emptying (Diabetes, spinal cord injury or multiple sclerosis). These patients require urodynamic investigation of their bladder (high storage or voiding pressures can put them at risk of hydronephrosis and renal impairment) and they may benefit from catheterisation (intermittent self catheterisation or indwelling).

UTI associated with stones

There is a higher proportion of proteus and pseudomonas infections²⁴ in patients with stone disease. Staghorn calculi are particularly associated with 'urea-splitting' organisms such as proteus, providencia, morganelia and corynebacterium as the ammonia produced improves bacterial adherence and enhances struvite crystal aggregation (25) (Figure 2). The treatment aim is to eradicate the infection and remove the stone entirely. If removal of stone is not possible long-term antibiotics may need to be considered.



Figure 2: An Xray demonstrating a left sided partial staghorn calculus and a photograph of a staghorn calculus removed during an open pyelolithotomy.

Prostatitis

Bacterial prostatitis usually presents with perineal pain that occasionally radiates into the groin. There may be new irritative LUTS and a tender prostate on examination. Investigation is tailored to identify a cause (ascending UTI, urethral instrumentation, prostate biopsy). A long course of antibiotics (2-4 weeks) is required to eradicate the infection.

In summary

UTIs are common and are encountered in most fields of medicine. Foundation doctors can contribute to reducing the development of resistant strains of bacteria by helping prevent infections. Techniques include using aseptic catheterisation, removal of catheters as soon as they are no longer required and considering other forms of bladder drainage or containment of urine.

Reducing patients exposure to inappropriate use of antibiotics is also important. The daily ward round is a good opportunity to review the need for antibiotics and to change antibiotics according to sensitivities with the intention of avoiding long-term use of broadspectrum antibiotics. Recognition of obstructed, infected upper tracts and necrotizing infections and prompt referral to Urology for treatment will help reduce the significant morbidity and mortality from these conditions.

UTI: IT'S COMPLICATED

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ISSN
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