‘An interventional urology list’ – a novel concept for UK urological services

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ABSTRACT

INTRODUCTION Almost all patients in the UK with obstructed and/or infected kidneys are referred to interventional radiology for percutaneous nephrostomy and/or placement of an antegrade JJ stent. Although this ‘tradition’ is going strong in the UK, urologists throughout the world have evolved their practice to encompass such interventional procedures in their remit. We have set up a local anaesthetic list ‘interventional urology list’ in our ESWL suite. We present our 4-year experience and discuss the benefits that this interventional list brings to our patients, our trainees, our interventional radiology colleagues and to the hospital trust.

PATIENTS AND METHODS From May 2005 to May 2009, we have been running this list, twice-weekly, performing procedures such as nephrostomies, antegrade stents, nephrostograms and stent exchanges all under local anaesthetic.

RESULTS A total of 580 procedures have been carried out on this list over this period. Our success rate for nephrostomy insertion is 96% with three failures, as a result of patient discomfort. No major complications and three minor complications were reported. We had four failed antegrade stenting procedures (out of 80). All other procedures including nephrostograms, stent exchanges/removals/insertions, as well as renal cyst aspiration and sclerotisation were successfully carried out.

CONCLUSIONS Our results of percutaneous nephrostomy and antegrade stenting are favourable when compared with published data on nephrostomies. This novel set up has resulted in several improvements to the service we offer patients and also provided significant improvement in training for our residents. We encourage other departments to try and develop this type of ‘interventional urology list’.

KEYWORDS

Interventional list – Urology – Percutaneous nephrostomy

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Almost all patients in the UK presenting to urologists and other specialities with obstructed and/or infected kidneys are referred to interventional radiologists for percutaneous nephrostomy and/or placement of an antegrade JJ stent. This is despite good evidence that urologists can safely and effectively obtain percutaneous renal access with comparable outcomes to radiologists.¹ Radiologists also carry out numerous nephrostograms and nephrostomy removals under fluoroscopy in patients with concurrent JJ stents to avoid the stent being inadvertently displaced. This is a heavy burden on interventional radiology lists, which are already oversubscribed. Furthermore, septic patients with obstructive uropathy sometimes end up in an intensive care unit often with poor outcome, whilst waiting to be transferred to a hospital with an interventional radiology department if one is not available on site. This is an increasing problem with hospital mergers and split-site hospital trusts.

Although this tradition is going strong in the UK, urologists throughout the world have evolved their practice to encompass such interventional procedures in their remit. This is because renal ultrasonography and percutaneous renal intervention, forms an integral part of their residency training. Urological tract ultrasound training has only recently been introduced as part of the syllabus in higher surgical training in urology in the UK.² However, this may be difficult to implement effectively as the infrastructure is not yet in place to train British urology trainees in ultrasound. It is clear to many of us that very few urology trainees get exposure to renal ultrasound. This important issue should be addressed by the British Association of Urological surgeons (BAUS) in conjunction with the Royal College of Radiologists (RCR).

At our centre, endourology trainees have access to an ultrasound scanner in our clinics where they receive super-

vised training in renal ultrasound by experienced consultants. We also have a portable ultrasound machine which can be used to scan in-patients. Endourology trainees also get supervised access training in percutaneous renal procedures such as nephrolithotomy as we perform our own ultrasound and fluoroscopically guided tracts (typically 120–130 percutaneous procedures a year) independent of radiologists.

In addition to this, they receive training in percutaneous procedures such as nephrostomies and antegrade JJ stenting and nephrostograms in a new type of local anaesthetic list we have set up in our shock wave lithotripsy (SWL) suite, entitled 'interventional urology list'. This list is run by a consultant urological surgeon supervising our endourology fellows and a specialist registrar in carrying out such procedures. The list is supported by our stone nurse specialist. This list aims to improve the exposure of our trainees to renal ultrasound and percutaneous interventional techniques as well as providing our patients with expert in-house treatment.

Furthermore, we aim to remain as independent as possible from radiology; as in other units, access to already overburdened interventional radiology lists for our patients has been sometimes less than forthcoming. This is often a problem with split-site hospital trusts such as ours where interventional radiology services are based on the other site and this often causes delay in treatment.

Here, we present our 4-year experience and discuss the benefits that this interventional urology list brings to our patients, our trainees, our interventional radiology colleagues and to the hospital trust.

Patients and Methods

The list is carried out in our state-of-the-art ESWL suite which is a fully integrated workstation with a C-arm, an ultrasound scanner with a targeting device and a light source enabling us to perform flexible cystoscopy. The suite is equipped with a full range of guidewires, ureteric catheters, access needles, ureteric dilators, nephrostomy kits and contrast media. All the medical team have radiation protection certification and are trained in operating the equipment in the ESWL suite. There is a fully stocked resuscitation trolley in case of emergency; however, all our procedures are carried out under local anaesthesia.

From 2005 to May 2009, we have been running this list every second week performing procedures such as nephrostomies, antegrade stents, nephrostograms, stent exchanges and aspiration and sclerosis of renal cysts.

In-patients at our hospital referred during normal working hours with an obstructed and/or infected kidney requiring nephrostomy or those who presented out-of-hours and had nephrostomies inserted by our radiology colleagues

and needed antegrade stenting were placed on this list. Patients requiring nephrostograms or removal of nephrostomies under screening were added when possible. Patients on our waiting list for local anaesthetic JJ stent insertion and stent exchanges as well as our postoperative stone patients who required timely stent removal were also deemed suitable to bring to this list. Patients with renal cysts requiring aspiration and sclerosis identified from our out-patient clinic were also scheduled.

Patient and procedural data were collected prospectively. All immediate and late complications as well as failures were recorded prospectively.

A full list of procedures under local anaesthesia is shown in Table 1.

Results

We have carried out a total of 580 procedures on this list over this 4-year period. A full break down of the procedures is provided in Table 1.

Our success rate for nephrostomy insertion is 96% (76 out of 79 attempted nephrostomy insertions) with three failures, as a result of patient discomfort. These were eventually placed by our radiology colleagues who carry out nephrostomy placements under sedation. All our patients having a nephrostomy placed had hydronephrosis and/or pyonephrosis due to stone disease, malignant obstruction or blocked stents. We have encountered no major complications and minor complications (urinary tract infection,

Table 1 A list of procedures carried out in the 'interventional urology list', May 2005 to May 2009

Procedure	Number
Percutaneous nephrostomy	79
Antegrade JJ stent	80
Nephrostogram	109
Nephrostomy removal	66
Retrograde JJ stent insertion	24
JJ stent exchange	48
JJ stent removal	113
Retrograde studies (using flexible cystoscopy)	10
Flexible cystoscopy	48
Percutaneous ultrasound-guided renal cyst aspiration and sclerotherapy	2
Combined antegrade/retrograde insertion of JJ stent	1
Total number of procedures	580

minor bleeding, tube blockage or displacement) were reported in three (4%) patients.

On this list, we also perform antegrade stents in patients with nephrostomies placed out-of-hours by radiologists as well as carry out retrograde studies, exchange and insert retrograde JJ stents via flexible cystoscopy (we use the flexible cystoscope to introduce a guidewire and then continue the procedure with image guidance using the C-arm). The indications for retrograde JJ stents were patients requiring stenting prior to ESWL (22 patients) and patients with pelviureteric junction (PUJ) obstruction awaiting pyeloplasty (two patients) who were in pain. Ten retrograde studies were done either to map ureteric length and anatomy (three cases) prior to semi-permanent metallic ureteric stenting or to ensure stone-free status after removal of JJ stents for previous ureteric calculi (seven cases). We had four failed antegrade stenting procedures (out of 80) either due to patient discomfort (two) or tight ureteric strictures (two). These patients went on to have supplementary procedures under anaesthetic in main theatres.

As we have the necessary equipment to do flexible cystoscopy in the ESWL suite, we can, on occasion, do a combined antegrade/retrograde procedure to stent a difficult ureter using the flexible cystoscope to grab and pull the guidewire out of the urethra to increase the tension on the wire and hence aid antegrade JJ stenting. There were no failures for the rest of the procedures listed in Table 1 and patients tolerated the procedures well.

Discussion

Our results of percutaneous nephrostomy and antegrade stenting are favourable when compared with published data on nephrostomies.^{3,4} Interestingly, the literature suggests that a large proportion of nephrostomies done out-of-hours in the UK are performed by radiologists who do not do this as part of their routine day to day commitments.³ This is against the advice of the Royal College of Radiologists.⁵ A recent attempt by the Royal College of Radiologists to set up a national nephrostomy registry revealed 16.5% of the nephrostomies performed were by general radiologists who do not perform the procedure as part of their routine clinical practice.⁴ The study also revealed that less than 0.5% of the nephrostomies were placed by urologists.⁴ The reasons behind this probably include lack of adequate access training for the urologist and the 'tradition' that placing a percutaneous nephrostomy is a radiological procedure that can only be performed by interventional radiologists. This is despite the fact that the literature shows that urologist-directed percutaneous nephrostomy placement is very safe and effective with failure rates and complications rates comparing favourably with radiology colleagues.^{1,5,6}

This novel set up has resulted in several improvements to the service we offer patients as well as providing increased exposure for our trainees to renal ultrasound and percutaneous nephrostomy placement. Although we acknowledge the numbers of nephrostomies and antegrade stents we have performed is still relatively small, the experience gained by our trainees in these procedures is invaluable and not available readily in other urology departments to our knowledge. Patients get access to an expert and efficient service, without having to wait on a routine hospital waiting list especially for procedures such as stent insertions, exchanges, removals and retrograde studies. Another important advantage is that, in contrast to our radiology colleagues, we can simultaneously perform antegrade and retrograde procedures and make definitive clinical decisions upon when to insert or remove nephrostomies and/or stents.

Patients are booked on to this list directly by our team (who plan the list and contact the patients directly); hence, the list runs efficiently with appropriately prioritised patients. Patients present to the ESWL suite directly unless they are already in-patients and hence do not need to take up or rely on hospital beds being available. This streamlined service minimises the waiting list and translates to less morbidity and less time off work for patients. Patients have direct access to a consultant and experienced trainees to answer any queries and plan further treatment, if required. As the list is carried out in our own ESWL suite by our staff, we do not have problems with late starts or patient cancellation due to over runs.

There are also significant benefits to the trust. Over this same period, 127 percutaneous nephrostomies (of which 19 had simultaneous antegrade stents) were recorded as having been done by interventional radiologists. Hence, a significant proportion (38.4%) of the percutaneous nephrostomies and most of the antegrade stents has been performed by urologists in our hospital trust. This undoubtedly reduces pressure on heavily overburdened radiology lists. This will enable our interventional radiology colleagues to have more time to use their expertise to take on the more challenging cases such as getting ultrasound-guided access into minimally or non-dilated collecting systems. It also makes effective use of an excellent in-house facility such as the ESWL suite and significant cost-savings to the trust. It removes patients from regular urology lists and reduces endourology waiting lists and hence frees up theatres to perform more complex work.

We have calculated a cost-saving to the trust of £217,760 over this 4-year period. These savings have been calculated as a result of freeing up slots on the interventional radiology list (costs for radiologist, nurse, hospital transport and additional hospital stay whilst waiting for percutaneous nephrostomy and/or antegrade stents – which sometimes

require a second visit to the interventional radiology suite), freeing up slots in interventional radiology for procedures such as percutaneous renal cyst aspiration and sclerotisation (cost for radiologist, nurse), freeing up slots on general radiology lists for procedures such as nephrostograms (cost for radiologist and nurse) and freeing up hospital beds and avoiding general/regional anaesthesia for procedures such as JJ stent insertion, exchange and retrograde studies.

We do not provide an out-of-hours service due to logistical and staffing issues and this is still provided by our interventional radiology colleagues.

We continue to evolve this list and are currently looking to start using Entonox (BOC Gases, Manchester, UK; 50% oxygen and 50% nitrous oxide) as an analgesic and sedative in those patients who find the interventions painful. We are looking to get anaesthetic support for this list as is the case with the daytime interventional lists run by the radiologists in our trust.

According to our previous experience, Entonox has been used successfully and safely without the need for anaesthetic cover, to reduce pain scores in patients undergoing numerous procedures including flexible cystoscopy and transrectal ultrasound-guided prostate biopsies.^{7,8} This will reduce the number of patients referred on by us to have some of these interventions by the radiologists who routinely do them under sedation with anaesthetic support at our trust.

To the best of our knowledge, there is no urological department in the UK that offers this novel service to their patients and we encourage other departments to try and develop this type of 'interventional urology list' as there are significant benefits to all concerned. This set-up will

encourage urologists to expand their range of skills (may be most suited to endo-urologists and endo-urology trainees), improve training for higher surgical trainees, improve patient care, reduce pressure on overburdened interventional radiology list and will allow us to keep pace with urological practice across the rest of the world.

However, if urologists are to establish this type of list, it should be set up in conjunction and with the support of their radiology department so that co-operation and team working between the departments is not compromised as this is essential for best patient care.

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