

Case Series: The Ambulatory Management of Patients with Suspected Acute Pyelonephritis

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Abstract

Aim: The European Association of Urology (EAU) defines management for patients with suspected pyelonephritis (SP), including renal tract ultrasound scan (USS). Patients are often admitted despite risks of hospitalisation. Our aim is to define safe criteria for patients to be managed using a “suspected acute pyelonephritis ambulatory (SAPA) pathway”.

Methods: A closed loop quality improvement project was undertaken starting with a baseline audit of all patients with SP over two months in 2017. Fifty patients discharged within 24 hours of admission were found to have six defining characteristics, forming inclusion criteria for our SAPA pathway. Trial of the SAPA pathway began after staff education. Pathway patients follow a specific ambulatory management pathway, ending in same-day discharge with USS and Urology review the following day. Outcomes of SAPA pathway patients were then prospectively audited.

Results: 73 patients have been managed via this SAPA pathway so far. 0 patients have required further admission following review the following day. 30-day readmission is 0%. No patients have been found to have renal tract obstruction on USS.

Conclusion: This closed loop audit proves that patients can be safely managed through an ambulatory pathway. More study is required to expand inclusion criteria for this bed-saving pathway.

1. Introduction

Pyelonephritis is defined as infection of one or both kidneys, often by the ascension of bacteria from a urinary bladder infection [1]. It presents with a conglomerate of symptoms including fever, lethargy, flu-like illness, lower urinary tract symptoms and flank pain. The most common bacteriological cause is *Escherichia coli* [2]. Pyelonephritis has an incidence of 1 in 830 patients per year in the UK [3].

There is a spectrum of patients who present to the on call surgical team with flank pain with or without fever or lower urinary tract symptoms- it is imperative in these patients to rule out the patient having an infected obstructed renal tract, a urological emergency. The European association of Urology [4] guidelines on pyelonephritis state a renal tract ultrasound scan (USS) should be performed.

Pyelonephritis itself has therefore commonly been seen as a diagnosis requiring admission to hospital. Hospitalisation leads to increased risk to the patient including risk of hospitalised infection and venous thromboembolism [5]. A US study in 2000 estimated the national cost of pyelonephritis admissions to be in the region of 2.14 billion dollars [6]. Ambulatory care pathways have been proven to be safe in many health conditions and reduce hospital bed pressures [7].

The aim of this study was to identify patients with suspected pyelonephritis (SP) who would be suitable to be treated with an ambulatory management pathway, and that this could be performed in a safe manner. The secondary aims were to reduce hospital admissions for patients with SAP. We also aimed to analyse positive findings on USS in this cohort of patients.

2. Methods

A baseline audit of patient notes was performed of 50 patients admitted under Urology to our department who were discharged within 24 hours of admission in 2017. These patients were found to have the six following clinical and pathological characteristics:

1. Age <50
2. White Cell Count <14×10⁹/Litre
3. CRP<40 mg/Litre
4. Acute Kidney Injury Score ≤ 1 (Kidney Disease: Improving Global Outcomes (KDIGO) score) [8]
5. No history of complicated urinary tract infection
6. No rigors

These six criteria were therefore used as inclusion criteria for entering patients presenting to the emergency urology team with suspected pyelonephritis (symptoms of flank pain +- lower urinary tract symptoms +- fever) into our SAP pathway. Patients entering this pathway were assessed by the admitting urology doctor or advanced nurse practitioner, and if deemed appropriate were managed in the following manner.

1. Single dose of IV antibiotics as per trust guidelines for treatment of SAP, any recent sensitivities and allergy status
2. One litre IV crystalloid over one hour
3. Oral analgesia as required
4. If NHS Early Warning observation (NEWS) [9] score ≤ 3 then discharged home with 7-day prescription of oral antibiotics (as per trust guidelines for treatment of SAP, any recent sensitivities and allergy status)
5. Return the following morning for a renal tract ultrasound scan (USS) and clinical review by the Urology team

A prospective audit of patient notes entered into this pathway was then undertaken over 12 months in 2018-2019. The primary outcome analysed was re admission (all cause) to hospital within 30 days of entering the pathway. Our secondary outcome was to analyse the positive findings on patients' renal tract ultrasound, in particular looking for evidence of renal tract obstruction. Our third outcome was analysis of the rate of surgical intervention requirement for patients entered into the pathway.

3. Results

73 patients were managed using this pathway over a twelve-month period (1.4 per week). 0 patients required re-admission to hospital either on return for review on day one or within 30 days of management with the SAP pathway.

Of 73 renal tract ultrasound scans undertaken, there was no evidence of renal tract obstruction within this cohort of patients. Positive findings on USS were of renal cysts in 7 patients- these simple and did not require further assessment, and two small renal stones. The latter two patients were managed conservatively after Urologist review.

0 patients required surgical intervention when managed via this pathway.

4. Discussion

This case series describes the safe management of patients with suspected pyelonephritis (SP) using an ambulatory pathway. This avoids the known risks of hospitalisation as well as streamlining the assessment of patients with SP. We have proven that patients who meet our six inclusion criteria do not require admission to hospital.

Our inclusion criteria were based on our baseline audit. Older patients (age>50) and those with features of a complicated UTI are much more likely to require longer hospitalisation. Obviously, patients who have a moderate or worse acute kidney injury need more expedited assessment of their renal tract. Our other blood pathology parameters, White Cell Count and c-reactive protein, are relatively strict- and many patients may miss the opportunity to go through this pathway as they do not meet these criteria.

Our management pathway is easily replicated in most hospitals. The pathway is safe as it allows for the admitting team to re-review the patient after an hour of treatment to ensure they are not becoming septic prior to discharge. A next day renal tract ultrasound scan was used to ensure there was no evidence of renal tract obstruction as mandated by the EAU guidelines on pyelonephritis. The patient returning day one also allowed for the early review of these patients and acting upon their US result. With the advent of the COVID-19 pandemic hospitals have been trying to reduce the footfall through hospitals and increase inpatient bed availability. One could argue that it would be preferable to do an ultrasound scan at the time of initial assessment, therefore negating the need for the patient to return for an ultrasound. This approach is however unlikely to be feasible as often these patients present out of hours when ultrasonography services are not available. The day one USS also allows for further review the next by clinicians to ensure the patient is improving. It could also be argued that, given the low rate of positive findings on these USS, that this scan is not required. More patient numbers are required to be able to assess this conclusion safely. Subjectively, the follow up ultrasound reassured both the patient and the clinician.

In conclusion, this SP ambulatory pathway is safe to use and saves hospital bed stays. It raised the question of whether a renal tract ultrasound is required in cohort of patients. More study in a larger population is required to study this. More research is ongoing to look at expanding the inclusion criteria (such as increasing the white cell count or c-reactive protein parameters) to safely include a larger group of patients who would benefit from this ambulatory care pathway.

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