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### Introduction

On 1st July 2008 a care pathway for patients presenting with renal colic was introduced in the Emergency Department at Sligo General Hospital. Previously patients who presented to the ED with symptoms of renal colic were usually evaluated initially with plain film radiography (KUB).

Plain film KUB was an inexpensive test in which large calculi could easily be seen. However, confounding factors such as overlying bowel gas, faecal material or osseous structures could hide small calculi. Rounded calcifications in other structures (e.g. phleboliths, calcified lymph nodes, arterial calcifications) can be difficult to distinguish from renal calculi (2). If a calculus is seen on plain film, further investigations are required. The sensitivity of plain radiographs has been reported to be as low as 45% (3).

#### Evidence for use of CT as an initial screening tool

In recent years, spiral CT without contrast has been proposed as the initial screening tool. Introduction of protocols, using CT as the initial evaluation tool, has been shown to lead to earlier definitive diagnosis and shorter hospital stays. In one study, time to diagnosis was reduced from an average of 16.8 hours to 6.3 hours. Radiological costs were reduced by 22% and the average time spent in the ED was reduced by 44% (4). Despite concerns about increased radiation exposure (2), another study showed that because CT results in a definitive diagnosis sooner, it lessens the need for additional radiology to the extent that the mean total radiation dose per patient was reduced by 50% (5).

#### Timing of investigations and follow-up

Admission for urgent intervention is clearly required in a patient with intractable pain or vomiting, infected upper urinary tract, impaired renal function, anuria, or solitary kidney (6). European Urological guidelines recommend that the remaining patients require some form of imaging to make the diagnosis, and to plan subsequent management (7). However, there is no consensus on the timing of investigations. Protocols have been put in place which advocate CT KUB either immediately, or within 48 hours of presentation. However, one Swedish study compared immediate imaging with imaging within 2-3 weeks (8). It was shown that those patients whose investigations were delayed did not suffer increased morbidity.

#### Introduction of the Care Pathway

In light of the above evidence, the ED introduced a care pathway which specified immediate CT KUB for patients presenting during office hours, or next-working-day CT KUB for patients who fitted specific discharge criteria.

In cases where CT was positive for stones without obstruction, the patient would be discharged, with a surgical OPD appointment within 1-2 weeks. Patients with obstructive stone disease were referred to the general surgeons for admission.

### Aims

It was proposed that introduction of this pathway would lead to:

- A reduction in the numbers of acute admissions of patients with renal colic
- Improved consistency in the investigation and management of these patients
- Earlier and more accurate definitive diagnosis
- A reduction in the number of unnecessary investigations

The purpose of this study is to assess the performance of the pathway in achieving these goals.

### Materials and Methods

Initially a retrospective chart review was carried out comparing the management of patients who presented to the ED with renal colic, for a 3-month period before and after introduction of the pathway. To potentially remove any "Hawthorne" effect an 8-month period from January 2009 to August 2009 was subsequently analysed.

#### Inclusion criteria were:

- Patients aged 18 to 65 presenting with sudden onset severe flank pain +/- radiation to groin, +/- nausea, +/- haematuria (macro or micro).

#### Exclusion criteria were:

- Pregnancy
- Hx of Solitary Kidney
- Hx Renal transplant

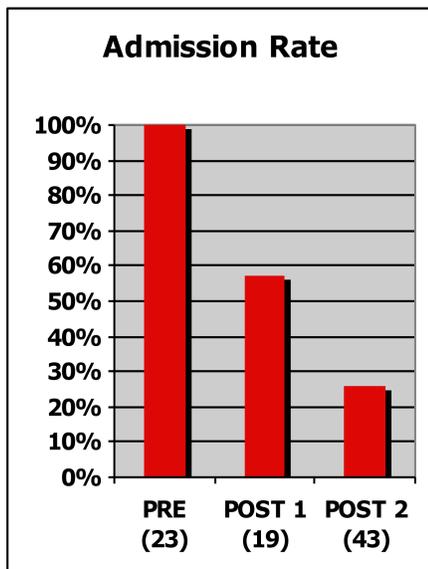
The current Information Systems limited our ability to accurately identify patients with specific presentations. Therefore, using the Radiology Records system, we identified all ED patients who had a CT KUB or XR KUB from April 1st 2008 to September 30th 2008. The patients' charts were reviewed and all patients meeting the above criteria included. Patients were divided into two groups depending on whether they presented before or after July 1st 2008 (the date the pathway was introduced). Subsequently data was collected on patients on the Pathway from January 2009 to August 2009.

The following outcomes were compared between the groups:

- admission rate
- length of stay
- number of investigations (KUB, CT, IVP, US)
- time to definitive diagnosis

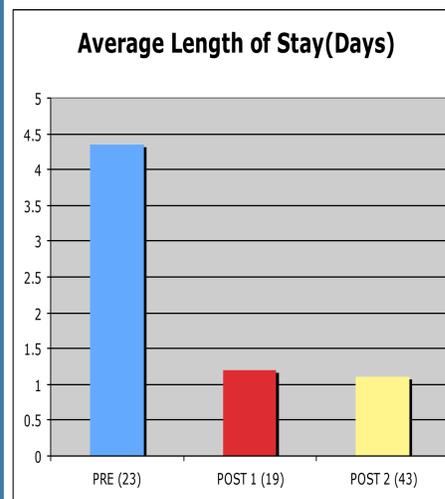
### Results

Initial 3 month results showed a reduced admission rate for renal colic from 100% (23/23 pre pathway) to 57% (11/19) in the first period post pathway introduction. This lower admission rate reduced again in the 2nd period assessed to 26% (11/43)

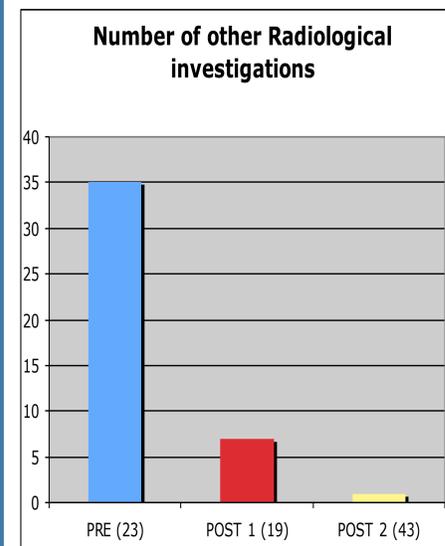


### Results

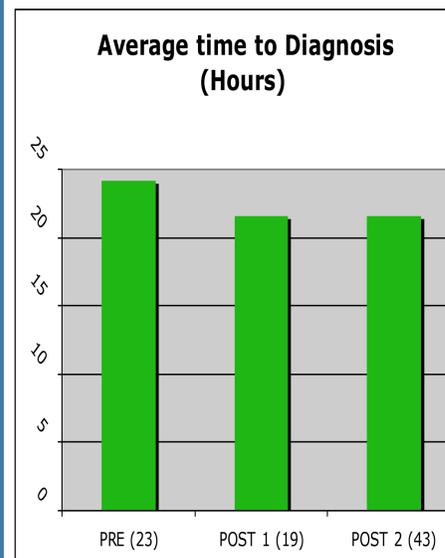
Average Hospital length of stay (LOS) reduced from 4.35 hospital days (pre) to 1.2 (post). This reduced average LOS was seen to be maintained in the subsequent analysis.



Numbers of other radiological investigations apart from CT KUB have decreased significantly (34/56, pre vs. 7/26 post 1 and 1/43 post 2).



Time to definitive diagnosis was 24.1 hours in the pre pathway group vs 21.6 post implementation of the pathway.



### Conclusion

Our study has the limitation of being a retrospective, observational study. However, the results would suggest that introduction of a care pathway for patients with renal colic, with CT KUB as the first-line radiological investigation, does lead to reduced admission rates, reduced hospital length-of stay, and reduced number of further investigations required to make the diagnosis. More patients are now managed as ambulatory cases, without prolonging the time to definitive diagnosis.

This Care Pathway has led to improved efficiency and consistency in the assessment and management of patients presenting to the ED with renal colic.

### References

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