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STONE score as a triage tool to guide primary decision making in suspected Renal Colic

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WHY IS THE NEW PATHWAY REQUIRED?

Renal stones are relatively common, with an estimated lifetime incidence of 12%. Men are more commonly affected than women with a ratio of 3:1, with a lifetime risk of 10–20% in men and 5% in women. Despite the high incidence of the condition, there is still no widely accepted algorithm to guide the art of ordering laboratory and radiological investigations, with resultant variations in approach to patients.

As such the diagnosis of acute ureteric colic is still based on clinical assessment and classically, near patient urinalysis, along with subsequent appropriate imaging. Several historical studies have demonstrated the need to show haematuria to reliably suspect a diagnosis of ureteric colic. These older studies were performed when CT was not widely used for the detection of calculi. They were instead based on results from intravenous urograms (IVU), which are less accurate at detecting stones; however, it is the authors' opinion that there remains a presumption amongst many clinicians that microscopic haematuria is a pre-requisite to justify radiological investigation of potential renal tract calculi - this notion that the absence of haematuria makes a ureteric calculi unlikely has been challenged by reports suggesting that calculi may be present in as many as 9–18% of patients who have no haematuria but classical signs and symptoms.

Numerous studies have shown that unenhanced CT (CTKUB) is a diagnostically superior, safer, quicker, and more cost-effective investigation for acute renal colic in adults and has been accepted standard practice worldwide. It also forms the imaging investigation of choice in the Royal College of Radiologists iRefer guidelines in the UK and American College of Radiologists Appropriateness Criteria.

However, there are a myriad of diseases that can present with symptoms of flank pain and many patients have non-specific flank pain with no confirmatory diagnosis identified at CT. It is crucial to select the appropriate subgroup of patients who require radiological investigation for detecting calculi as CT involves a considerable radiation dose, even when modern low-dose protocols are employed. Approximately one-third of all CT examinations requested have been found not to be justified by clinical need, and therefore, any approach to developing protocols for the request of CT examinations in the investigation of ureteric colic must be dogmatic and ensure acceptable diagnostic

yields. Additionally studies have shown the incidence of a "negative" CT examination to be significantly higher in women than in men in renal colic investigation.

An historical audit of diagnostic yields for CTKUB requested from the Emergency Department in UHL showed a pick up rate for significant stones of 46%, in line with an accepted standard of 44-62% and an alternate diagnosis rate of 14%. Thus a negative scan rate of 40%. In contrast, the diagnostic yield in patients referred direct to test from primary care in 2016 was 7%, with 0% of patients having an alternate diagnosis to account for the pain. Thus the diagnostic yield was way below an accepted standard. Interestingly no female under the age of 40 was found to have significant renal stones in the study period.

A study from 2014 has suggested a simple "STONE score" system to risk stratify patients based on gender, race, the duration of pain, associated symptoms, and presence of haematuria on urine dipstick.

http://www.bmj.com/content/348/bmj.g2191

Using the STONE score we prospectively assessed 282 CTKUB referrals from primary care. The overall diagnostic yield for significant calculi and alternate diagnosis were again 7% and 0% respectively. However, when stratifying for the STONE score the following results were found:

	Low (n=132)	Moderate (n=138)	High (n=12)
Clinically significant calculi	**0%**	32 (23%)	8 (67%)

No female under 40 years of age with any 'stone score' was found to have a clinically significant stone or alternative diagnosis within the study period.

As such the stone score is being implemented as a triage tool for primary care requests for investigation of presumed renal colic in line with IRMER guidelines, to improve diagnostic accuracy and reduce the number of unnecessary CT investigations.

HOW DOES THE PATHWAY WORK?

A stone score is generated at the time of requesting a CT for renal colic. The stone score derives points based on various demographic and clinical parameters:

Categories	**Points**
Gender	
Male	2
Female	0
Timing (duration of pain to presentation)	
>24 hours	0
6-24 hours	1
<6hours	3
Race	
Black	0

Non-black	3
Nausea and vomiting None Nausea alone Vomiting	 0 1 2
Dipstick haematuira Absent Present	 0 3
Total	0-13

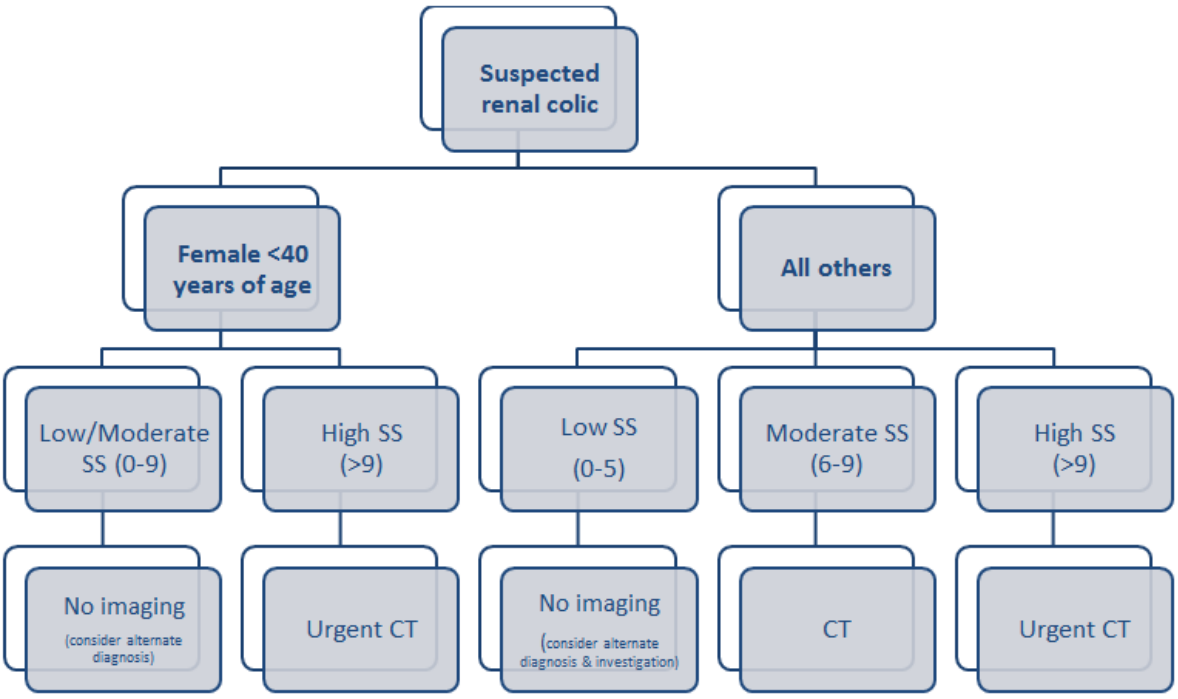
Scoring

Low probability = 0-5 points

Moderate probability = 6-9 points

High probability = 10-13 points

The pathway is then based upon the following flowchart and will advise on whether a CT scan is required based upon the patient score:



Please note stone score data input is required at the time of requesting a CT for investigation of renal colic. **If the stone score is low, please do not request a CT KUB and consider alternative diagnosis. Requests for CT in patients with low scores will be rejected.**