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D.I.R.E.C.T. Pathway (Delayed Imaging to Reduce Excessive Computed Tomography) for the Evaluation of Patients with Suspected Renal Colic

Daniel Bak MS4
University of Vermont, dmbak@uvm.edu

Peter Weimersheimer MD
University of Vermont

Kevan Sternberg MD
University of Vermont

Aaron Greenspun BS
University of Vermont

Roz Bidad BSN, RN
University of Vermont

Authors

Daniel Bak MS4; Peter Weimersheimer MD; Kevan Sternberg MD; Aaron Greenspun BS; Roz Bidad BSN, RN; and David Sobel MD

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Daniel Bak, MS4; Peter Weimersheimer, MD; Aaron Greenspun, BS; David Sobel, MD; Roz Bidad, BSN, RN; Kevan Sternberg, MD

Department of Surgery, Divisions of Emergency Medicine and Urology, UVM Health Network – UVM Medical Center

BACKGROUND

- Acute renal colic is one of the most common presentations to the ED
- CT is the current gold-standard imaging modality due to its high sensitivity and specificity
- Alternative imaging modalities have been explored due to concerns of exposure to ionizing radiation, cost and incidental findings associated with CT
- US has been shown to be a safe alternative in this clinical scenario
- The majority of patients diagnosed with ureterolithiasis in the United States receive a CT scan
- 75% of patients with an acute obstructing ureteral stones will pass the stone without surgical intervention
- Therefore, the majority of patients with suspected urolithiasis will receive a CT as usual care despite the results having no effect on the clinical course of the patient
- A more rational approach would limit the use of CT to cases where findings would directly impact clinical management

PURPOSE

A clinical care pathway was developed to delay the use of upfront CT scans in patients with high suspicion of uncomplicated ureterolithiasis

Goals:

- Reduce the number of upfront CT scans obtained for suspected uncomplicated ureterolithiasis
- Reduce radiation exposure and cost to patients
- Decrease the need for follow-up care for incidental CT findings
- Improve ED workflow and utilization of resources
- Standardize a pathway to efficiently evaluate, discharge, and ensure appropriate and timely outpatient urologic follow-up

MATERIALS & METHODS

- Prospective, IRB approved study, supported by an internal UVMHN Safety and Value grant
- Developed patient flow algorithm defining eligibility, screening, diagnostic evaluation, discharge instructions, and out-patient follow-up (Figure 1)
- Obtained approval from the divisions of emergency medicine and urology and provided education sessions to explain the rationale and the process of the study design
- Research coordinators with the assistance of the Emergency Medicine Research Associate Program (EMRAP) organized workflow, collected data, and coordinated follow-up after the ED visit

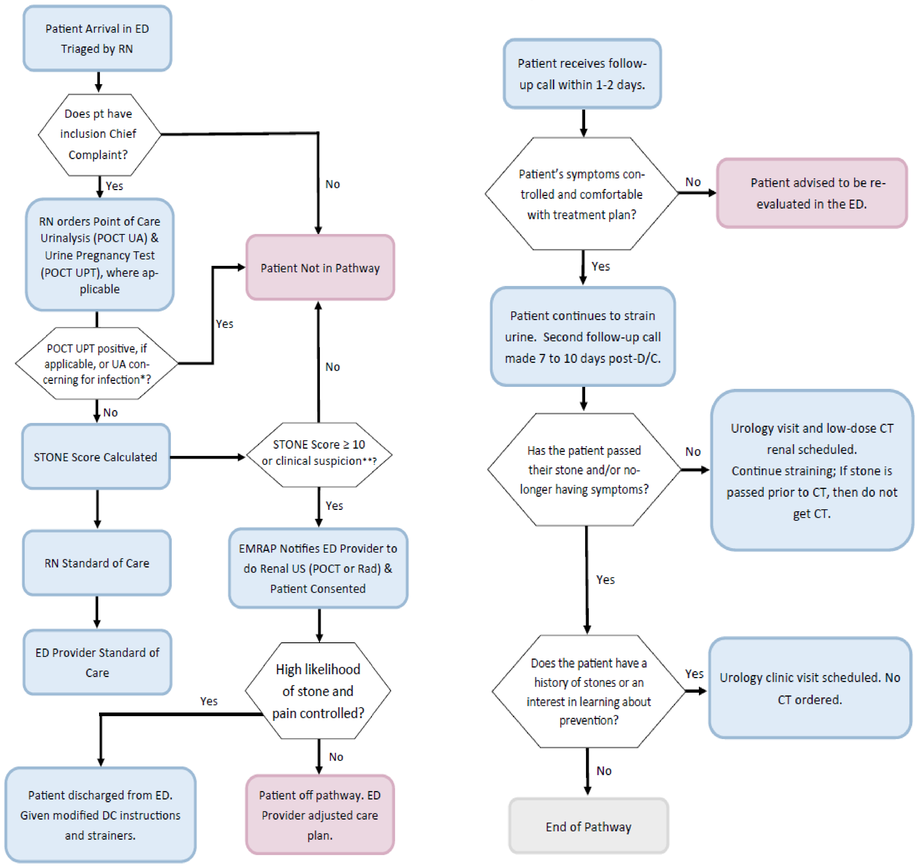

Figure 1. Patient care pathway for screening, determination of eligibility, and enrollment in the Emergency Department (left), and the urologic follow-up process (right) following discharge.

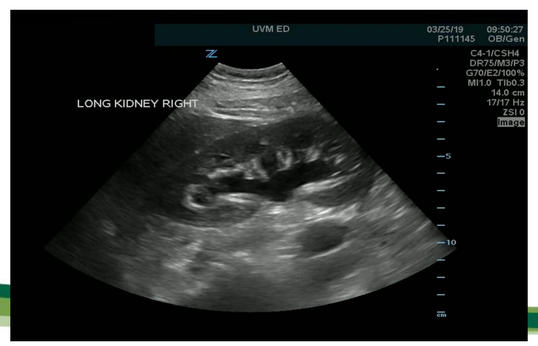

Figure 2. Ultrasound of right kidney showing moderate hydronephrosis.

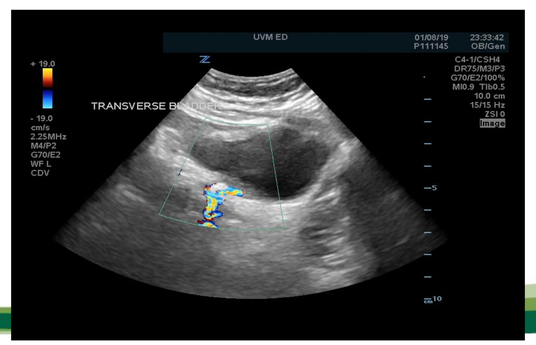

Figure 3. Ultrasound of the bladder showing a ureteral calculus with partial obstruction of outflow.

RESULTS

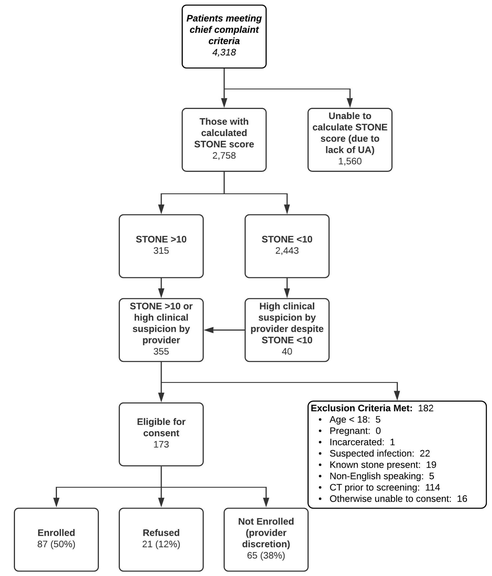

Figure 4. Patient enrollment.

- 87 subjects were enrolled and received US as initial imaging modality
- 50 (57%) had evidence of hydronephrosis
- 64 (74%) received only US during the study period
  - 24 had confirmed passage of stone
  - None of remaining 40 returned to the ED or received CT
- 23 (26%) received US + CT
  - 10 ultimately passed stone
  - 9 required surgical intervention
  - 4 had no evidence of stone

CONCLUSIONS

- Through a coordinated effort between Urology and Emergency Medicine, an US first, delayed CT approach for the evaluation of patients with suspected renal colic is both feasible and safe.
- ¾ of enrolled patients received US alone with no missed alternative diagnoses or complications. 10% required surgery.
- Avoiding upfront CT imaging should be strongly considered in this patient population.
- Study limitations include low enrollment, % lost to follow up, and short follow up period.
- The need for confirmatory imaging or clinical follow-up to ensure stone passage remains a question that will require further study and additional long-term data.

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