The use of CT KUB in evaluation of suspected renal colic in emergency department: a secondary care hospital experience

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Purpose

Renal colic is a common clinical presentation in emergency department. CT KUB is widely used as the preferred imaging investigation for ED patients with suspected renal colic in concordance with BAUS, ACEM and NICE guidelines.\textsuperscript{4, 7, 8}

Although the estimated effective dose of CT KUB is relatively low, it carries the burden of radiation exposure to patients. It is imperative to ensure appropriate use of CT KUB in achieving necessary diagnostic information without exposing patients to excessive radiation through overuse.

The audit aims to assess appropriate use of CT KUB in a specific cohort of patients in this institution by reviewing the following:

- diagnostic yield of urolithiasis
- rate of significant alternative diagnoses
- the rate of urological intervention in positive cases

It will allows evaluation of the practice of the institution and its adherence to current guidelines.
Methods and materials

Patients who presented to emergency department with suspected renal colic and subsequently underwent CT KUB between 1 October 2017 and 31 March 2018 were identified retrospectively using PACS.

Exclusion criteria includes:

- Urinary tract infection
- Known persisting renal calculus within 6 months prior to the CT KUB
- Follow-up for renal calculus

A 128-slice helical CT scanner performed at 100kV, 35mA and 2.0 mm width was used to scan the patients.

All CT KUB images were either primarily or secondarily reviewed by a consultant radiologist.

The CT KUB reports, patients’ follow-up and information regarding interventions in positive cases were obtained from the patients’ electronic record and management system.

Ethical approval and patient consent were not required in our institution for this retrospective case series study.
Results

246 patients were identified to have met the inclusion criteria: 38% of the patients were female and 62% were male.

The mean age was 49 years (range, 15 - 89 years).

136 patients were positive for urolithiasis (55.3%) and 100/136 (73.5%) cases were accompanied by hydronephrosis.

The positive rate is higher in males (65.4%) compared to females (38.7%) with a statistically significant difference between gender, \( p < 0.001 \). No statistically significant association is identified between age and positive diagnosis.

For patients with diagnostic yield of urolithiasis, urological interventions were necessary for 29 (21.3%) cases, while the other 107 (78.7%) cases were managed conservatively. Mean calculus size in these groups were 8.6mm and 3.9mm respectively, \( p < 0.001 \).

10% (25 patients) of the patients included in the study had significant alternative diagnoses, including:

- Advanced bladder TCC
- Renal cell carcinoma
- Duodenal perforation with retroperitoneal haematoma
- Multiple liver abscess
- Renal transplant haematoma from arteriovenous fistula
- Colitis
- Acute pancreatitis
- PID and tuboovarian abscess

The rate of equivocal results was 2.4%, comparable to other studies.
Fig. 1: Patients demographic

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Table 1: Diagnostic yield of urolithiasis according to gender

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**Fig. 2:** Urological intervention for positive cases

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Fig. 3: Large transitional cell cancer involving mainly left bladder wall, 70mm length x 13mm thickness, causing bilateral hydroureter and hydronephrosis.

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**Fig. 4:** 11cm renal cell carcinoma arising from the lower pole of the right kidney.

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**Fig. 5:** CT KUB showed retroperitoneal free gas and haematoma in patient with duodenal perforation day 5 post ERCP. Findings were subsequently confirmed via a portal venous phase CT abdomen and pelvis.

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Conclusion

The rate of positive urolithiasis and significant alternative diagnoses for the ED patients who underwent CT KUB this institute were comparable to other published studies.\textsuperscript{3,5} There is statistically significant association between gender and diagnostic yield of urolithiasis, with male predominance. Together with good history taking and clinical assessment, this audit supports the use of CT KUB as the preferred imaging modality for investigation of suspected renal colic with good diagnostic yield. However, it is noted that there is a significant percentage of negative CT KUB in females. Current practice can be further improved by considering other imaging modalities when investigating young female patients with suspected renal colic to avoid unnecessary radiation exposure.
References