Healthcare Innovations
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Imaging use for renal colic at the RBWH Emergency and Trauma Centre: implications for patient flow and radiation exposure

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Background

Computed tomography of kidney, ureter, bladder (CTKUB) is the gold standard investigation for renal colic but radiation exposure concerns and comparable diagnostic accuracy have promoted ultrasound (USKUB) use. This study sought to investigate potential implications of emergency department imaging use for renal colic diagnosis on patient flow and individual outcomes.

Method

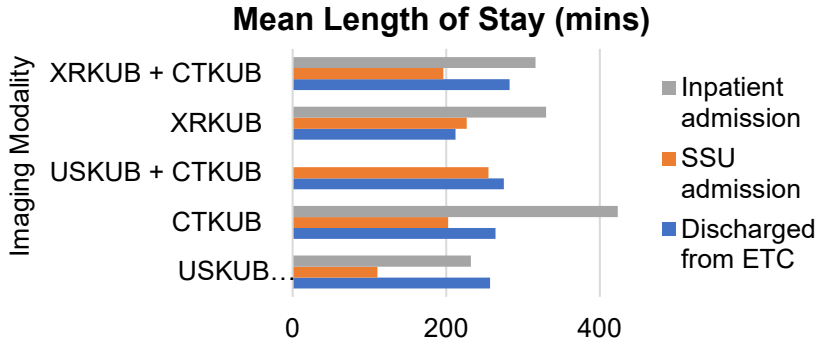
A retrospective study considered all presentations of suspected acute renal colic between 2019-2020 at the RBWH Emergency and Trauma Centre (ETC). Diagnosis codes "urinary calculus" or "renal colic" extracted from Emergency Department Information Systems© were cross-referenced with picture archiving and communication system to obtain patient demographics, length of stay (LoS), time to imaging, imaging modality (including x-ray; XRKUB), radiation dose and patient disposition. Statistical analysis was performed.

Results

- Female (21% vs 6% male, p<0.0001), younger patients (33yrs USKUB vs 49yrs CTKUB, p<0.001) were more likely to undergo USKUB.
- Patients receiving USKUB were more likely to be admitted to SSU (71% vs 44%) for longer periods (mean 511 vs 401 minutes, p=0.05).
- Initial imaging with USKUB correlated with longer total LOS in ED in all patients (mean 599 minutes vs 440 minutes, p<0.01) and in first presentations (mean 604 vs 443 minutes, p<0.01) versus CTKUB.

Patient Data

Patients	Total	590
	Imaged	75%
	Mean age (years)	47±17
Imaging Modality	CTKUB	71%
	USSKUB	13%
	>1 modalities	24%
Disposition	Discharged	33%
	SSU admission	35%
	Inpatient admission	32%



Radiation Exposure

- Females received higher mean radiation doses (519.9 vs 447.1mGy-cm; p=0.16).
- CTKUB was preferred to USKUB at representation (24% vs 17%; p=0.01), resulting in a higher cumulative radiation dose than initial presentation (451 vs 309mGy-cm; p=0.02).

Conclusion

- Use of multiple imaging modalities and SSU admission increases LoS.
- Initial USS correlated with longer LoS, SSU LoS, and identification of fewer stones.
- Representations result in higher cumulative radiation exposure.
- More research is needed to reduce LoS and radiation exposure, including ultra-low dose CTKUB.