A single centre experience of CT-KUB scans for the investigation of acute renal colic
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Background
CT-KUB (kidneys, ureters and bladder) is the gold standard recommended by The Royal College of Radiologists and the British Association of Urological Surgeon for the investigation of acute renal colic [1, 2]. Apart from detecting urolithiasis, CT-KUB can also find other pathologies that resemble renal colic. As CT-KUB involves significant radiation, the diagnostic yield of CT-KUB should be monitored to justify over ultrasound and X-ray scans [3].

Standard
1. CT-KUBs should be done within 24 hours of acute renal colic [3].
2. Published diagnostic yield of CT-KUBs: Calculi detection: 44-64%, alternative diagnoses: 6-18% [3-6].

Indicator
1. Percentage (%) of CT-KUBs conducted within 24 hours of request.
2. % of patients undergoing CT-KUB with a) urolithiasis, b) Alternative diagnosis & c) no radiological diagnosis.

Target
1. CT-KUBs performed within 24 hours: 100%
2. Calculi detection: >44%, Alternative diagnoses: >6%

Methods
1st Audit cycle: July 2016 – December 2016
2nd audit cycle: September 2017 - March 2018
200 consecutive CT-KUB scans conducted in the university hospital of North Tees were identified from the radiology information system (RIS). Patient demographics, CT-KUB request and scan timings and scan results were obtained from RIS. Scans with insufficient details of renal colic symptoms were excluded. % of CT-KUBs conducted within 24 hours of request and CT-KUBs diagnostic yield were calculated.

Results

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1st Audit cycle: 194 scans</th>
<th>2nd Audit cycle: 183 scans</th>
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<tbody>
<tr>
<td>CT-KUB done within 24 hours</td>
<td>75%</td>
<td>76.5%</td>
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<td>Scan findings</td>
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<tr>
<td>Calculi detection (43%), alternative diagnoses (14%), no radiological diagnosis (43%).</td>
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<tr>
<td>Calculi detection (41%), alternative diagnoses (23%), no radiological diagnosis (36%).</td>
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Conclusion
1. There is insignificant difference between the percentage of CT-KUBs conducted within 24 hours of request in both audits (75% vs 76.5%). The delay may be related to reduced CT access during the weekend period.
2. The calculi detection rate decreases from 43% to 41%, alternative diagnoses increases from 14% to 23% and scan with no diagnosis decreases from 43% to 36% in the 2nd audit. Discussion with the local radiological department found calculi detection above 40% as an acceptable rate.
3. Calculi detection rate is significantly higher in male than female in both audits. As the average calculi detection rate in female is low (35%), ultrasound should be considered first to investigate for acute renal colic in female patients.

References
3. Al-Bakir J, Tse D, O’Costa N. Radiological investigation of renal colic following the introduction of CT KUB. RCR Audit Live. 2010. Available at: https://www.rcr.ac.uk/audit/radiological-investigation-renal-colic-following-introduction-ct-kub

Figure 1: A radiopaque calculus on the pelvic ureteric junction of the left kidney.
Figure 2: Alternative diagnosis of acute diverticulitis.
Figure 3: Graphs showing the outcome of CT-KUB scans in female and male patients in the 1st and 2nd audits.

3. Calculi detection above 40% as a acceptable rate.