Is Low Dose Really Low Dose?
A Clinical Audit of Low Radiation Dose CT KUB Studies for Suspected Urinary Tract Calculi

Declaration of Conflict of Interest

• Chahal, B.S. - None
• Kwan, A.L.C. - None
• Lambert, R.G.W. – Consultant for Bioclinica
• Nielsen, M.M. - None
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• Olubaniyi, B.O - None
The Audit Cycle

1. Identify the problem
2. Set standards
3. Collect Data
4. Compare results with standards
5. Implement change
6. Conclude or re-audit
Identify the Problem

The Dangers of Radiation Exposure, Pt. 1

CT KUB gold standard for investigating renal colic\textsuperscript{2}

High prevalence requiring repeated studies\textsuperscript{3}

Cumulative radiation dose can be high\textsuperscript{3}
Audit Team

- Fellow
- MD Student
- Department Head/Radiologist
- Senior CT Technologist
- CT Technologist
- Quality Assurance Coordinator/Radiologist
- Body Imaging Radiologist
- Physicist
Set Standards

TARGET:

80% at $\leq 3 \text{ mSv}^4$

We considered:

A. Two targets
B. 3 protocols based on BMI

Not realistic
40 studies (from one machine)

3 mSv or less achieved in 6/40  15%

[Target: 3 mSv or less in 80%]

Target not met
1. Change Noise Index from 33 to 40
2. Increase iterative reconstruction blend from 40% to 50% (ASIR)
Re-Audit Results (2nd cycle)

39 studies

3 mSv or less achieved in 7/39  18%

[First cycle was 6/40  15%]

[Target: 3 mSv or less in 80%]

Target STILL not met
1. Change Noise Index: 40 to 50
2. mA: 10 minimum - 300 maximum
3. Scan length:
   • “Above the liver to lesser trochanter”
   • “1cm above the kidneys to 1 cm below the pubic symphysis”
Re-Audit Results (3rd cycle)

37 Studies

3 mSv or less achieved in 15/37  41%

[Second cycle: 7/39      18%]
[First cycle:      6/40      15%]
[Target: 3 mSv or less in 80%]

Target STILL not met
Comparing Cycles

Effective Dose (mSv)

First Cycle
Second Cycle
Third Cycle

Max
Mean
Min
Implementation Issues

1. Over scanning
2. Larger patients
Behavior Change

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>EFFECTIVENESS</th>
</tr>
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<tbody>
<tr>
<td>Emails</td>
<td>✗</td>
</tr>
<tr>
<td>Word of mouth</td>
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<tr>
<td>Staff Meeting</td>
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<tr>
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<td>Engagement¹,²</td>
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¹,²: Referenced studies or data.
Audit Conclusion

• Target not met at first cycle
• Target not met after first intervention
• Target not met after second intervention
• Third intervention performed. Await fourth cycle.
• Further changes?
Future Direction

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UAH Scanners

Edmonton Hospitals


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