The Effects of a National Dissemination Project Aimed at Reducing Radiation Dose for Kidney Stone CT

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Purpose

- Kidney stones (KS) afflict 1 in 11 people in the U.S. and are responsible for 2 million ED annual visits, often in young patients who will have repeat presentations.
- ACR Appropriateness Criteria promotes reduced-radiation dose CT (RDC) exams for KS evaluation, however in 2015-2016 less than 8% of these KSCTs met reduced dose criteria (DLP <200).1
- Using the ACR Dose Index Registry (DIR) we performed a randomized, controlled trial to measure the effect of the dose optimization in stone evaluation (DOSE) intervention on KSCT radiation dose.

Methods

- Intervention includes access to free online educational modules on the RadIQ platform (http://www.radiq.org) and/or individualized consultation.
- The first educational module provides RDCT images to increase users’ KS diagnostic proficiency and other significant findings.
- The second module provides an overview of CT scanner settings and their subsequent effects on dose.
- DOSE consultation consists of:
  - Conference calls to discuss facilities’ obstacles for protocol change
  - Provide PQI guidance
  - Provide recommendations for RDCT protocols specific to facilities’ scanner(s) (Figure 2)
- Our statistical analysis sought to compare mean facility DLP for the baseline year (2015) and intervention year (2017) between control facilities and intervention facilities that engaged in DOSE intervention.
- Medians and means with 95% confidence intervals were compared using a student’s t-test.

Results

<p>| Mean Facility DLP (mGy·cm) for control and DOSE participating intervention groups |</p>
<table>
<thead>
<tr>
<th>Control Facilities</th>
<th>DOSE Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility n</td>
<td>2015</td>
</tr>
<tr>
<td>Exam n</td>
<td>50,190</td>
</tr>
<tr>
<td>Mean</td>
<td>691.3</td>
</tr>
<tr>
<td>(Std Dev)</td>
<td>(224.5)</td>
</tr>
<tr>
<td>Median</td>
<td>688</td>
</tr>
<tr>
<td>(IQR)</td>
<td>(528.8-836.1)</td>
</tr>
<tr>
<td>Min</td>
<td>191</td>
</tr>
<tr>
<td>Max</td>
<td>1414.1</td>
</tr>
</tbody>
</table>

*P-value<0.05

- Of the 108 facilities randomized to intervention, 33 (29%) participated in DOSE.
- Table 1 demonstrates facility mean DLP at baseline and follow up.
- There was a significant change in facility mean DLP (-149.2 mGy·cm, 95% CI: 5.87-170.76) for the facilities engaging in the intervention (P<0.05) compared to the control group’s mean facility DLP (-64.5 mGy·cm, 95% CI 22.37-89.24).

Conclusions

- Practice quality improvement projects, facilitated by education and individualized consultation, can lead to significant reductions in radiation exposure.
- Collaborative efforts such as these can facilitate better adherence to the As Low As Reasonably Achievable (ALARA) principal.
- Future DOSE direction includes providing intervention to control facilities to further promote this important message.

References


Disclosures

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