Radiation doses to patients from barium meal and barium enema studies in the Western Cape Province, South Africa

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Introduction
Barium studies are radiographic procedures used to diagnose abnormalities of the digestive system. The limiting radiation used in these procedures is potentially harmful and therefore needs to be monitored.

Study Aims:
1. Investigate radiation dose received from the barium meal (BaM) and barium enema (BaE) examinations
2. Recommend regional Diagnostic Reference Dose Levels (DRLs) for these procedures

Methodology
• Study sites: 3 state hospitals
• Fluoroscopy units: digital and conventional units
• Measuring instrument: Dose Area Product meter (DAP)
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Objectives

BaM
1. Measure radiation dose for BaM and BaE
2. Compare the radiation doses with those previous international studies
3. Investigate causes for dose variation

Findings

<table>
<thead>
<tr>
<th>BaM</th>
<th>Findings</th>
<th>BaE</th>
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</thead>
<tbody>
<tr>
<td>Mean Dose: 16.6 Gycm(^2)</td>
<td>First and third quartile DAP values: 18.4 Gycm(^2) and 20.1 Gycm(^2)</td>
<td>Mean Dose: 28.7 Gycm(^2)</td>
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<tr>
<td>Median Dose: 13.6 Gycm(^2)</td>
<td>First and third quartile DAP values: 18.4 Gycm(^2) and 20.1 Gycm(^2)</td>
<td>Median Dose: 27.4 Gycm(^2)</td>
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<tr>
<td>Table 1: Mean and third quartile DAP values for BaM</td>
<td>Table 2: Mean and third quartile DAP values for BaE</td>
<td>Table 3: Mean and third quartile DAP values for BaE</td>
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Conclusions
1. The median DAP values of 13.6 Gycm\(^2\) and 27.4 Gycm\(^2\) for BaM and BaE respectively are the recommended DRLs as they are less affected by under and over weight of the patients.
2. Radiation dose incurred with patients’ weight for BaC unlike BaM.
3. There is no direct linear correlation between DAP and fluoroscopy time for both BaM and BaE. This was however attributed to comparing radiologists at different levels of training employing different equipment types.
4. Increased experience of the radiologists resulted in lower dose delivery.
5. Radiation dose savings were realised with digital units as compared to conventional fluoroscopy units.

Acknowledgement
1. The state hospitals where the research was conducted

References