Paediatric CT Practice - How safe is imaging in different countries?

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Portuguese paediatric computed tomography practice

1. List of the facility’s CTDI and DLP for children from different age groups

<table>
<thead>
<tr>
<th>Dose descriptor: CTDIvol (mGy)</th>
<th>Head</th>
<th>Chest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodyshielded Patient</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Dose data were collected for three dedicated public paediatric centres in Portugal, each representing a geographic region of Portugal: Hospital Dona Estefânia do Centro Hospitalar Lisboa Central, Hospital Pediátrico de Coimbra do Centro Hospitalar e Universitário de Coimbra and Centro Hospitalar de São João, Porto. The dose data were collected during 2012 and include CT examination information from 2011.

2. How radiation protection during paediatric CT is practised in the facility

There are no guidelines used in Portugal regarding radiation protection of children undergoing CT imaging. A research study, which started two years ago, has raised the need to improve practice, adopt protocols accordingly, reduce radiation dose and avoid unnecessary CT examinations for paediatric patients.

According to our results, to optimise paediatric CT examinations exposure parameters (tube current, tube voltage, pitch, scan length) must be tailored to patient size (1–5). To decrease the dose in radiosensitive organs such as the eye lens, thyroid gland, breasts and gonads, out-of-plane (conventional) or in-plane shielding can be applied (6–8).

3. Assessment of the number of paediatric CT examinations that lack appropriateness

The appropriateness of paediatric CT examinations was not included in this research study. Professional guidelines in Portuguese are not available for aiding referral justification. Early editions of the Royal College of Radiologists referral recommendations were noted as available in the three centres, however not the most recent edition of iRefer (RCR 2013). As these guidelines are in English it was reported by local staff that they had limited use by radiographers and radiologists.

4. Data on the percentage of dose reduction in CT of children

Currently employed scanning protocols for head and chest examinations were applied to a Catphan® 600 phantom, following which multiple experimental combinations of exposure parameters were applied to review the impact upon the CT Dose Index (CTDIvol - mGy). Contrast-media (600 mg I/mL) were then injected into a phantom, following which multiple experimental combinations of exposure parameters were applied to review the impact upon the CT Dose Index (CTDIvol - mGy). Contrast-media (600 mg I/mL) were then applied to review the impact upon the CT Dose Index (CTDIvol - mGy).

5. How we child size our CT imaging

The three regional centres categorised children by age; however, age subsets are defined differently across centres and are not aligned with paediatric radiography recommendations (9) or in a format which matches other published European paediatric CT DRL data (10–12).

There is still substantial evidence of protocol differences and a lack of continuity in the manner with which paediatric patients are age categorised and examined in dedicated Portuguese paediatric centres. Furthermore, one must also consider that whilst Portugal has three national paediatric centres and three further sites with specialised paediatric services, incorporating 24-hour care, a large proportion of paediatric CT examinations are performed in adult centres, potentially without tailored paediatric protocols.

6. Number of paediatric CT referrals that are reviewed by radiologists before giving appointments

There is a lack of evidence indicating the number of paediatric CT referrals that are amended in Portugal.

Poster References: