Acceptance of the EU regulations on mean doses of glandular on women's during mammographic examination in the Czech Republic

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Diagnostic reference levels (further DRU) are on indications for medical irradiation regulation. DRU = 3 mGy per pictures and standard breast thickness 45 mm was used for CC projection during mammographic examination in the Czech Republic.

However the examinations in EU country indicated that the mean glandular dose for standard breast thickness 45 mm was reduced to a 

\[ D_g = 2 \text{ mGy} \]

per picture.

At the same time there was a change of standard breast thickness from 45 mm to 53 mm, new standard for glandular dose was set up to

\[ D_g = 2.5 \text{ mGy} \]

The valves above are state per CC projection and film density 1,5 – 1,9 OD.

Therefore the new limits of glandular dose \( D_g \) for particular PMMA thickness were issued in European Guidelines of QC of mammography screening in the year 2003:

<table>
<thead>
<tr>
<th>Thickness of PMMA [mm]</th>
<th>Equivalent breast thickness [mm]</th>
<th>Acceptable level glandular dose [mGy]</th>
<th>Achievable level glandular dose [mGy]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>21</td>
<td>0,8</td>
<td>0,6</td>
</tr>
<tr>
<td>30</td>
<td>32</td>
<td>1,3</td>
<td>1,0</td>
</tr>
<tr>
<td>40</td>
<td>45</td>
<td>2,0</td>
<td>1,6</td>
</tr>
<tr>
<td>45</td>
<td>53</td>
<td>2,5</td>
<td>2,0</td>
</tr>
<tr>
<td>50</td>
<td>60</td>
<td>3,3</td>
<td>2,6</td>
</tr>
<tr>
<td>60</td>
<td>75</td>
<td>5,0</td>
<td>4,0</td>
</tr>
</tbody>
</table>

The aim is to estimate, whether glandular dose measured during examinations in CZ fulfil recommended levels for particular PMMA equivalent thickness as stated above.

For this purpose, the analysis was conducted using data of Acceptance test and Test of long-term stability per each individual PMMA thickness, selected switch as:

- high voltage tube usage,
- entrance surface kerma in air \( Ka \),
- optical density OD of film,
- mean glandular dose \( D_g \) estimate of calculation.

The data were gained by measurements on 125 devices of 10 types.

Acceptance of new value DRU and entrance surface kerma in air \( Ka \) amend in regulation No. 307/2002 Sb. and bulletin MZ ČR No. 11/2002 will be stand:

- over fulfilment of recommended values on 20% till 30 % apparatus, (especially for screening investigation),
- over fulfilment acceptable values on 10% till 20 % apparatus, (especially for indicated investigation).

In order to decrease irradiation and improve imaging, it is important to pay attention to:

- setting up pictures parameters of rtg. devices in whole field of application,
- setting up to film processors,
- using appropriate imaging systems (combinations film – intensifying screen and cassette),
- proficiency and responsibility medical staff examining and answer able to determination of diagnosis.