of the NEPHRIC trial (n = 129 patients), which shows a smaller incidence of contrast-induced nephropathy by using iso-osmolar contrast media [2]. However, we also have not changed our routine daily clinical approach in 2008 by using the low-osmolar contrast media, because the published results were conflicting in the last 2 years.

In our paper, we emphasized these conflicting results concerning the value of the osmolality of a contrast media (iso-osmolar versus low-osmolar) in preventing contrast-induced nephropathy by citing three recent trials (RECOVER with n = 300 patients published in 2006, IMPACT with n = 166 patients published in 2006 and CARE with n = 414 patients published in 2007).

It was described by the authors of the RECOVER trial, Jo et al., that they indeed found a benefit regarding the composite end-point. Regarding the end-point defined by Aspelin et al. in the NEPHRIC trial, no benefit of the iso-osmolar contrast media could be demonstrated [3].

In the IMPACT and the CARE trial there were no different rates of contrast-induced nephropathy by the use of low- versus iso-osmolar contrast media [4,5]. The CARE trial is the most recent and largest, prospective, randomized double-blind trial comparing the iso-osmolar ioxaglate 370 with the low-osmolar iodixanol-320: when a composite end-point was assessed, the rate of contrast-induced nephropathy was not significantly different (10.3% versus 12.9%) after the administration of the different contrast media [5].

From our point of view, the results are so conflicting that there is no evidence of the superiority of the iso-osmolar versus the low-osmolar contrast media and no firm recommendation based on the overwhelming majority of evidences can be made.

Conflict of interest statement. None declared.

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S-cystatin C formulae or combination of s-cystatin C and s-creatinine formulae do not improve prediction of GFR

Sir,

We read with great interest the original article by Tidman et al. [1] on the development and validation of the new Orebro-cyst formulae for GFR estimation based on cystatin C serum concentration and combination (mean) of the new formulae and the MDRD equation. The Orebro-cyst equations are constructed using the calculated production rate and extra-renal clearance of cystatin C. Two equations are formulated for different methods of cystatin C determination (DAKO and Gentian). In the aforementioned paper, a formula that combines MDRD and Orebro-cyst provided a greater accuracy than formulae based on s-creatinine or s-cystatin C alone. We have investigated whether the new Orebro-cyst (Gentian) equation or its combination with MDRD can improve proportion of correctly classified patients for CKD stages in our cohort.

Our study was performed on 100 Caucasian subjects: 57 CKD patients, 28 kidney transplant patients and 15 volunteers. In all cases GFR was measured as the plasma clearance of iohexol (iGFR). Creatinine was determined by a enzymatic method (Randox) and cystatin C serum concentration and combination (mean) of iGFR in 95% of the cases). The proportion of correctly classified patients for CKD stages in our cohort.

In our study group the most accurate results were obtained with the Mayo Clinic quadratic equation [2]. Results were within 30% of iGFR in 85% and within 50% of iGFR in 95% of the cases. The median (range) of eGFR was 19.50 (7–141) ml/min/1.73 m². The estimated GFR (eGFR) was calculated based on creatinine concentration by the Cockcroft–Gault formula corrected to body surface area (CG/BSA), the abbreviated MDRD equation (aMDRD) and Mayo Clinic quadratic equation, and based on cystatin C serum concentration by Hoek, Larsson and Orebro-cyst (Gentian) equations. The performance of these formulae was analysed according to recommendations in the NKF K/DOQI guidelines. Table 1 shows percentage of patients correctly classified for the different stages of CKD based on the calculated eGFR.

In our study group the most accurate results were obtained with the Mayo Clinic quadratic equation [2]. Results were within 30% of iGFR in 85% and within 50% of iGFR in 95% of the cases. The median (range) of eGFR was 19.50 (7–141) ml/min/1.73 m². The bias was 1.6 ml/min/1.73 m² and precision (±1.96 × standard deviation from difference) −16.6–19.8 ml/min/1.73 m². The Orebro-cyst formula was significantly less accurate than the Mayo Clinic equation. Results were within 30% of iGFR in 63% and within 50% of iGFR in 82% of the cases. The median (range) of eGFR was 18.00 (4–168) ml/min/1.73 m². The bias was 6.0 ml/min/1.73 m² and precision −24.2–36.1 ml/min/1.73 m².

The formula created by combination of the Orebro and aMDRD equation was more precise than Orebro or Mayo Clinic alone (−13.5–14.3 ml/min/1.73 m²) and less biased (0.4 ml/min/1.73 m²), but accuracy was not better than Mayo Clinic (within 30% of iGFR in 79% and within 50% of iGFR in 95% of the cases). The proportion of correctly
The proportion of correctly classified patients for CKD stages

<table>
<thead>
<tr>
<th>iGFR</th>
<th>n</th>
<th>Equation</th>
<th>CG/BSA (%)</th>
<th>aMDRD (%)</th>
<th>Mayo Clinic (%)</th>
<th>Hoek (%)</th>
<th>Larsson (%)</th>
<th>Orebro-cyst (%)</th>
<th>Mean aMDRD/Orebro (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥90</td>
<td>11</td>
<td>36</td>
<td>9</td>
<td>91</td>
<td>91</td>
<td>82</td>
<td>100</td>
<td>91</td>
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</tr>
<tr>
<td>60–89</td>
<td>11</td>
<td>82</td>
<td>45</td>
<td>64</td>
<td>55</td>
<td>18</td>
<td>55</td>
<td>64</td>
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</tr>
<tr>
<td>30–59</td>
<td>21</td>
<td>71</td>
<td>90</td>
<td>71</td>
<td>76</td>
<td>90</td>
<td>76</td>
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<tr>
<td>15–29</td>
<td>14</td>
<td>64</td>
<td>57</td>
<td>50</td>
<td>79</td>
<td>57</td>
<td>57</td>
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<tr>
<td>&lt;15</td>
<td>43</td>
<td>63</td>
<td>86</td>
<td>93</td>
<td>28</td>
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<td>70</td>
<td>79</td>
<td>55</td>
<td>63</td>
<td>75</td>
<td>78</td>
<td></td>
</tr>
</tbody>
</table>

iGFR—plasma iohexol clearance (ml/min/1.73 m2); n—number of patients.

classified patients was not better than the Mayo Clinic formula.

To our knowledge there is no previous report on evaluation of Orebro-cyst or combination of the Orebro-cyst and MDRD equation in independent patients group. Unlike Tidman et al., we could not show superiority of combination of both s-creatinine and s-cystatin C formulae for GFR estimation in our patients. In our opinion, none of the evaluated equation was suitable for GFR estimation in diverse population. All of them may cause misclassification in a selected group of patients.

Conflict of interest statement. The results presented in this paper have not been published previously in whole or part, except in abstract form.

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Reply

Sir,

We appreciate the comments made by Joanna Urbaniak et al. concerning our article [1] and their evaluation of our cystatin C formula for eGFR (Orebro-cyst). Although...