New faecal calprotectin cut-off points for remission and active disease defined by UCEIS and Nancy indices in ulcerative colitis (UC)

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BACKGROUND
• Disease activity assessment is an essential part of management in UC
• It most accurately evaluated by endoscopy and biopsy
• Most published cut-offs for faecal calprotectin (FCal) in UC are based on prediction of relapse, rather than prediction of current endoscopic or histopathologic activity

METHODS
• The TrueColours UC pilot collected daily symptoms (simple clinical colitis activity index, SCCAI), monthly FCal (IBDoc®), and endoscopic/histopathological activity (UCEIS and Nancy indices) at two time points over 6 months
• Correlations between the below values were computed by repeated measurements correlations (rmcorr) in the R package
  o FCal (μg/g)
  o SCCAI (median of measurements for 14 days prior to FCal)
  o UCEIS (range 0-8, within 14 days of FCal)
  o Nancy indices
  o Nancy indices
• Definitions of remission and active disease remain debated, so two groups were created.
  Group A defined remission as UCEIS 0 AND Nancy 0, and active disease as UCEIS ≥4 AND Nancy ≥3.
  Group B defined remission as UCEIS ≤1 AND Nancy ≤1, and active disease as UCEIS ≥4 AND Nancy ≥3.
• Mann-Whitney U test was applied to values of FCal to estimate statistical significance.

RESULTS
• The number of times that a correlation could be made between FCal and other indices was termed ‘number of instances’ (Table 1)
• There was poor correlation between FCal and SCCAI (rmcorr 0.311), but good correlation with UCEIS and Nancy indices

Table 1: Pair-wise correlations between FCal and other indices

<table>
<thead>
<tr>
<th></th>
<th>FCal rmcorr</th>
<th>95% CI</th>
<th>Number of instances</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCAI (median 5 days prior to FCal)</td>
<td>0.311</td>
<td>0.159 to 0.449</td>
<td>198</td>
<td>0.000148</td>
</tr>
<tr>
<td>UCEIS (within 14 days of FCal)</td>
<td>0.701</td>
<td>0.243 to 0.903</td>
<td>53</td>
<td>0.003617</td>
</tr>
<tr>
<td>Nancy (within 14 days of FCal)</td>
<td>0.829</td>
<td>0.511 to 0.947</td>
<td>53</td>
<td>0.000134</td>
</tr>
</tbody>
</table>

FCal = IBDoc® faecal calprotectin (measured in μg/g of faeces), 95% CI = 95% confidence intervals,

• The distributions of FCal values for the combined UCEIS AND Nancy criteria (Figure 1) show highly significant (p<0.0001) discrimination by FCal between endoscopic and histologically defined remission and active disease in both groups.
• Contingency tables for remission and active groups are presented in Figure 2

Figure 1: Distribution of FCal for remission and active disease

(A) Remission defined as UCEIS = 0 AND Nancy = 0. Active disease defined as UCEIS ≥4 AND Nancy ≥3.
(B) Remission defined as UCEIS = 0 - 1 AND Nancy ≤1. Active disease defined as UCEIS ≥4 AND Nancy ≥2.

Table 2: Summary of classification procedure for remission and active disease groups

<table>
<thead>
<tr>
<th></th>
<th>UCEIS AND Nancy</th>
<th>UCEIS AND Nancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Remission</td>
<td>Remission</td>
</tr>
<tr>
<td></td>
<td>UCEIS ≤1 AND</td>
<td>UCEIS ≤1 AND</td>
</tr>
<tr>
<td></td>
<td>Nancy 0</td>
<td>Nancy 0</td>
</tr>
<tr>
<td>Active disease</td>
<td>UCEIS ≥4 AND</td>
<td>Active disease</td>
</tr>
<tr>
<td></td>
<td>Nancy ≥3</td>
<td>UCEIS ≥4 AND</td>
</tr>
<tr>
<td></td>
<td>Nancy ≥2</td>
<td>Nancy ≥2</td>
</tr>
</tbody>
</table>

Cut-off FCal (μg/g) 147 180
Accuracy 86% 82%
Sensitivity 85% 82%
Specificity 89% 82%
ROC AUC 0.888 0.920

FCal = IBDoc® faecal calprotectin (measured in μg/g of faeces)
UCEIS = Ulcerative Colitis Endoscopic Index of Severity, Nancy = Nancy Histopathologic Index where

CONCLUSIONS
• An FCal <180 μg/g is indicative of endoscopic and histological remission
• FCal may act as a reliable marker of mucosal healing, replacing the need for endoscopy in some patients