**Supplemental Tables**

**Supplemental Table 1. Summary Endoscopic Measures**

|  |  |
| --- | --- |
| Variable | N=240 videos  N (%) or median (IQR) |
| Rectosigmoid UCEIS  Rectosigmoid UCEIS score of 0 | 4 (2-5), range 0-8  44 (18%) |
| Pancolonic UCEIS  Pancolonic UCEIS score of 0 | 2.6 (0.7-4.2), range 0-8  40 (17%) |
| Rectosigmoid MES  0  1  2  3 | 2 (1-3), range 0-3  44 (18%)  37 (15%)  83 (35%)  76 (32%) |
| Pancolonic MES | 1.4 (0.4-2), range 0-3 |
| Global endoscopic severity (GES) VAS (pancolonic)  None  Mild  Moderate  Severe | 44 (10-64), range 0-100  40 (17%)  43 (18%)  89 (37%)  68 (28%) |
| GES VAS (rectosigmoid) | 50 (10-70), range 0-100 |
| GES VAS by segment  Rectum  Sigmoid  Descending  Transverse  Right colon | 44 (10-67)  45 (6-68)  38 (0-65)  9.5 (0-58)  0 (0-49) |
| Higher UCEIS score proximal to rectosigmoid  Diagnostic colonoscopy  Reassessment | 52 (22%)  21 (26%)  31 (19%) |

MES – Mayo endoscopy score; UCEIS – ulcerative colitis endoscopic index of severity; VAS – visual analogue scale

**Supplemental Table 2. Summary Histology Measures**

|  |  |
| --- | --- |
| Variable | N=60 patients  N (%) or median (IQR) |
| Rectosigmoid RHI  Rectosigmoid RHI ≤3 without neutrophils1  Rectosigmoid RHI score of 02 | 7 (1-12), range 0-27)  16 (27%)  13 (22%) |
| Pancolonic RHI  Pancolonic RHI ≤3 without neutrophils1  Pancolonic RHI score of 02 | 6 (1.5-9.4), range 0-13.4  12 (20%)  11 (18%) |
| Rectosigmoid NI  0  1  2  3  4 | 2 (1-2), range 0-4  13 (22%)  3 (5%)  34 (57%)  4 (7%)  6 (10%) |
| Pancolonic NI | 1.7 (0.8-2.0), range 0-2.4 |
| RHI by segment  Rectum  Sigmoid  Descending  Transverse  Right colon | 7 (0-12)  6 (0-10)  6 (0-8)  5 (0-10)  5 (0-8.5) |
| Higher RHI score proximal to rectosigmoid  Diagnostic colonoscopy  Reassessment | 16 (27%)  5 (25%)  11 (28%) |

NI – Nancy Index; RHI – Robarts Histopathology Index

1Same results obtained with NI ≤1

2Same results obtained with NI=0

**Supplemental Table 3. Disease Extent and Endoscopic Severity in Diagnostic and Follow-Up Colonoscopies**

|  |  |  |  |
| --- | --- | --- | --- |
| N (%) or median (IQR) | Diagnostic (N=20) | Reassessment (N=40) | P-value |
| Extent at time of colonoscopy  E0  E1 (proctitis)  E2 (left-sided colitis)  E3 (proximal to splenic flexure)  E4 (proximal to hepatic flexure) | 0  0  4 (20%)  3 (15%)  13 (65%) | 10 (25%)  5 (12.5%)  9 (22.5%)  4 (10%)  12 (30%) | <0.001 |
| Rectosigmoid UCEIS | 5 (4-6) | 3 (0-5) | <0.001 |
| Pancolonic UCEIS | 4 (3-5) | 1.8 (0.1-3.2) | <0.001 |
| Rectosigmoid MES  0  1  2  3 | 0  1 (5%)  10 (50%)  9 (45%) | 11 (27.5%)  8 (20%)  10 (25%)  11 (27.5%) | <0.001 |
| Pancolonic MES | 2 (1.5-2.6) | 1 (0-1.8) | <0.001 |

MES – Mayo endoscopy score; UCEIS – ulcerative colitis endoscopic index of severity

**Supplemental Table 4. Spearman Correlations Between Endoscopic and Histologic Scores by Segment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | UCEIS | MES | RHI | NI |
| UCEIS | - | 0.94 (0.92-0.96) | 0.71 (0.69-0.75) | 0.67 (0.65-0.70) |
| MES | 0.94 (0.92-0.96) | - | 0.71 (0.66-0.73) | 0.67 (0.63-0.70) |
| GES | 0.95 (0.93-0.97) | 0.96 (0.94-0.97) | 0.72 (0.70-0.75) | 0.68 (0.66-0.71) |

Spearman correlations are presented as mean (minimum-maximum) across the four readers

GES – global endoscopic severity; MES – Mayo endoscopy score; NI – Nancy Index; RHI – Robarts Histopathology Index

**Supplemental Table 5. Accuracy of the UCEIS and MES to Identify Varying Degrees of Global Endoscopic Activity**

|  |  |  |  |
| --- | --- | --- | --- |
| Endoscopy Scores | At Least Mild Pancolonic GES (vs none)  AUC (95% CI) | At Least Moderate Pancolonic GES (vs up to mild)  AUC (95% CI) | At Least Severe Pancolonic GES (vs up to moderate)  AUC (95% CI) |
| Rectosigmoid UCEIS | 0.99 (0.97-0.998)1 | 0.95 (0.92-0.97)2 | 0.92 (0.88-0.95)4 |
| Pancolonic UCEIS | 0.99 (0.98-0.998)1 | 0.98 (0.97-0.995)2 | 0.95 (0.92-0.97)4 |
| Rectosigmoid MES | 0.98 (0.97-0.996)1 | 0.93 (0.90-0.96)3 | 0.88 (0.84-0.92)5 |
| Pancolonic MES | 0.99 (0.98-0.999)1 | 0.98 (0.96-0.99)3 | 0.95 (0.92-0.97)5 |

AUC – area under the receiver operator characteristic curve; GES – global endoscopic severity; MES – Mayo endoscopy score; UCEIS – ulcerative colitis endoscopic index of severity

Comparison of AUCs 1p>0.05, 2p=0.0028, 3p=0.0003, 4p=0.077, 5p=0.0025

**Supplemental Table 6. Accuracy of the UCEIS and MES to Identify Varying Degrees of Histologic Activity**

|  |  |  |  |
| --- | --- | --- | --- |
| Endoscopy Scores | At Least Mild Pancolonic RHI (vs none)  AUC (95% CI) | At Least Moderate Pancolonic RHI (vs up to mild)  AUC (95% CI) | At Least Severe Pancolonic RHI (vs up to moderate)  AUC (95% CI) |
| Rectosigmoid UCEIS | 0.93 (0.90-0.96)1 | 0.93 (0.90-0.96)3 | 0.78 (0.73-0.84)5 |
| Pancolonic UCEIS | 0.95 (0.92-0.97)1 | 0.96 (0.94-0.98)3 | 0.88 (0.84-0.92)5 |
| Rectosigmoid MES | 0.93 (0.90-0.96)2 | 0.89 (0.95-0.94)4 | 0.76 (0.71-0.82)6 |
| Pancolonic MES | 0.94 (0.91-0.97)2 | 0.95 (0.93-0.98)4 | 0.89 (0.85-0.93)6 |

AUC – area under the receiver operator characteristic curve; MES – Mayo endoscopy score; RHI – Robarts Histopathology Index (cut-offs based on analyses in manuscript); UCEIS – ulcerative colitis endoscopic index of severity

Comparison of AUCs 1p=0.016, 2p=0.0063, 3p=0.0055, 4p<0.0001, 5p<0.0001, 6p<0.0001

**Supplemental Table 7. Spearman Correlations Between Rectosigmoid and Pancolonic RHI/NI and Endoscopic Measures**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Endoscopic variable | Rectosigmoid RHI | Pancolonic RHI  Mean (min-max) | Rectosigmoid NI | Pancolonic NI |
| *Rectosigmoid Measures* | | | | |
| Rectosigmoid GES VAS | 0.68 (0.66-0.71)1 | 0.73 (0.72-0.74) | 0.73 (0.69-0.74)4 | 0.78 (0.76-0.81) |
| Rectosigmoid UCEIS | 0.67 (0.63-0.72)2 | 0.70 (0.68-0.72) | 0.69 (0.64-0.77)5 | 0.72 (0.68-0.77) |
| Rectosigmoid MES | 0.67 (0.64-0.69)3 | 0.68 (0.64-0.74) | 0.74 (0.73-0.75)6 | 0.73 (0.68-0.81) |
| *Pancolonic Measures* | | | | |
| Pancolonic GES VAS | 0.67 (0.64-0.72) | 0.78 (0.75-0.84)1 | 0.73 (0.72-0.73) | 0.82 (0.81-0.85)4 |
| Pancolonic UCEIS | 0.66 (0.63-0.68) | 0.83 (0.80-0.84)2 | 0.65 (0.62-0.69) | 0.81 (0.79-0.84)5 |
| Pancolonic MES | 0.65 (0.60-0.68) | 0.82 (0.80-0.84)3 | 0.68 (0.67-0.70 | 0.83 (0.79-0.85)6 |

Spearman correlations are presented as means (minimum-maximum) across the four readers

GES – Global Endoscopic Severity; MES – Mayo endoscopy score; NI – Nancy Index; RHI – Robarts Histopathology Index; UCEIS – ulcerative colitis endoscopic index of severity; VAS – visual analogue scale

Comparison of mean correlations 1p=0.060, 2p=0.0014, 3p=0.0037, 4p=0.077, 5p=0.027, 6p=0.069

**Supplemental Table 8. Spearman Correlations Between Rectosigmoid and Pancolonic RHI/NI and Clinical Activity Markers**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Endoscopic variable | Rectosigmoid RHI | Pancolonic RHI | Rectosigmoid NI | Pancolonic NI |
| PUCAI | 0.571 | 0.681 | 0.557 | 0.717 |
| Faecal calprotectin | 0.522 | 0.502 | 0.618 | 0.508 |
| CRPhs | 0.453 | 0.583 | 0.539 | 0.669 |
| Albumin | -0.374 | -0.464 | -0.4010 | -0.5210 |
| Hemoglobin | -0.435 | -0.405 | -0.3011 | -0.3411 |
| ESR | 0.336 | 0.296 | 0.3712 | 0.4012 |

NI – Nancy Index; PUCAI – pediatric ulcerative colitis activity index; RHI – Robarts Histopathology Index

Comparison of correlations 1p=0.071, 2p=0.79, 3p=0.058, 4p=0.22, 5p=0.68, 6p=0.60, 7p=0.011, 8p=0.15, 9p=0.051, 10p=11, 11p=0.62, 12p=0.70

**Supplemental Table 9. Robarts Histopathology Index (RHI) Cut-Offs for Mild, Moderate and Severe Global Endoscopic Severity**

|  |  |  |
| --- | --- | --- |
| GES Category | Pancolonic RHI Cut-Offs | Rectosigmoid RHI Cut-Offs |
| None | 0-1 | 0-2 |
| Mild | >1 to <5 | 3-6 |
| Moderate | 5 to <7 | 7-9 |
| Severe | ≥7 | ≥10 |

**Supplemental Table 10 – Studies Investigating the Endoscopic and/or Histologic Indices in Pediatric UC**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Study | Population | Items evaluated | Methods | Findings |
| Norsa 20211 | Pediatric IBD, N=8 UC | UCEIS | Retrospective blinded review by 11 physicians (without prior training) | * Fleiss’ kappa 0.41 for UCEIS inter-observer reliability; UCEIS vascular sub-item most reliable |
| Kovach 20192 | Newly diagnosed pediatric UC, N=36 | Rectosigmoid MES, rectosigmoid Geboes score | Retrospective review of endoscopy photos; independent review of biopsies by two pathologists | * Spearman correlations between Geboes score sub-items and MES 0.14 (lamina propria eosinophilia) to 0.48 (lamina propria neutrophilia) * Fair to moderate inter-observer agreement for Geboes score sub-items (weighted kappa 0.28 to 0.59) |
| Kerur 20173 | Established pediatric UC, N=99 | Rectosigmoid MES, PUCAI | Retrospective chart review, including endoscopy photos by two physicians | * Moderate-substantial inter-observer agreement for rectum MES (Cohen’s kappa 0.54, 95% CI 0.41-0.68); fair-moderate for sigmoid MES (Cohen’s kappa 0.44, 95% CI 0.32-0.56) * Significant correlation between MES and PUCAI (R2 0.43, p<0.001 for rectum MES; R2 0.25, p<0.001 for sigmoid MES) |
| Boyle 20174 | Newly diagnosed pediatric UC (PROTECT), N=369 | Rectal histology features including acute and chronic inflammation, according to a 5-point scale, MES, PUCAI | Prospective inception cohort, local endoscopy review, central review of rectal biopsies by a single pathologist | * MES and PUCAI distribution differed (non-linearly) across grades of acute and chronic inflammation |

MES – Mayo Endoscopy Score; PUCAI – Pediatric Ulcerative Colitis Activity Index

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