Results: In all patients US examination depicted thickened, hypoechoic ileal wall showing patterns of vascularization. In 8 patients Bauhin' valve edema was visible. In 16 children, inflammatory infiltration of the periintestinal fat around the affected segment of the intestine was found. In addition, all patients presented mesenteric lymphadenopathy with short-axis diameter of 10–15 mm. 8 patients had penetrating complications of Crohn's disease: 4 small intestine fistulas and 4 abscesses.

Conclusion: Given its safety profile and diagnostic efficacy, US examination should be considered as the first-line imaging modality for assessing inflammatory bowel disease in children. US proved to be a reliable and easily accessible tool in the diagnosis of enteric inflammatory lesions, evaluating CD activity and assessing potential penetrating complications of the disease.

WEARABLE SWEAT SENSING DEVICE FOR DETECTION OF IBD BIOMARKERS

Badrinath Jagannath, Sriram Muthukumar, Shalini Prasad

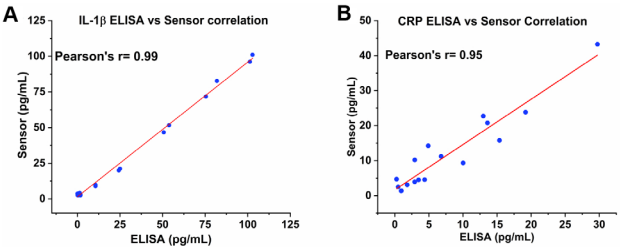
Introduction: Inflammatory Bowel Disease affects 1.2 million in the United States. Flare-up of the disease occurs in a random way and current testing methods lack ability for real-time prediction of a flare up. The levels of cytokines elevate during a flareup. Therefore, we hypothesize that real-time monitoring of cytokine biomarkers can be useful for early detection of flare-ups and provide better patient management. In this context, sweat-based diagnostics can be promising for real-time tracking of IBD biomarkers.

Materials and Methods: A wearable SWEATSENSER was developed by functionalization of specific affinity capture probes (IL-1β, CRP antibodies) on metal/semiconducting interface deposited on a porous patch substrate. Electrochemical impedance spectroscopy technique was used to detect the interaction between the specific antibody and target analyte. The developed SWEATSENSER was tested on 20 healthy human subjects in compliance with an approved IRB at UT Dallas. Continuous on-body measurements were recorded to report IL-1β, CRP levels in sweat in real-time.

Results: In this work, a wearable multiplexed sweat sensor for detection of IL-1β, CRP in sweat has been demonstrated. The sensor demonstrates a limit of detection of 1 pg/mL with a dynamic range from 1 pg/mL- 512 pg/mL for both the biomarkers in sweat. The sweat sensor demonstrated excellent correlation with reference ELISA method (Pearson's r ≥0.95). On-body monitoring using sweat sensor from passively perspired human sweat demonstrated a mean concentration of 28 pg/mL for IL-1β in healthy cohort.

Conclusion: A wearable sweat sensor was developed to monitor potential IBD markers in sweat. The developed device can be useful in better management of IBD patients.

Detection of IBD Related Markers, IL-1β and CRP in Eccrine Sweat



Disease Activity Assessment

COLLABORATIVE DEVELOPMENT OF CROHN'S DISEASE CLINICAL DATA STANDARDS BY STANDARDS DEVELOPMENT AND CROHN'S DISEASE EXPERTS TO FOSTER DATA REVIEW, SHARING, AND REUSE

John Owen, Rebecca Baker

Background: The ability to access expansive collections of well-curated biological, clinical, and behavioral data will propel scientific progress and enable the discoveries needed to improve treatments for human disease. Development and adoption of standards transform incompatible and disparate data into universal and illuminating information, facilitating discoveries that could have invaluable impact on Crohn's disease clinical research. When standards are applied, data is collected, organized, and analyzed in a clear and consistent manner, allowing *all* researchers to leverage information from studies around the world.

Required by the United States Food and Drug Administration (FDA) and Japan's Pharmaceuticals and Medical Devices Agency (PMDA) and adopted by the world's leading research organizations, CDISC standards enable the accessibility, interoperability, and reusability of data. CDISC standards addresses each step of the clinical research process to drive operational efficiencies within the organizations that use them, expedite the regulatory review process and reduce time to market.

Methods: With support from The Leona M. and Harry B. Helmsley Charitable Trust, CDISC formed a team of standards development and Crohn's disease experts to follow our consensus-based, clinical data standards process, which consists of six stages:

Scoping – Identification of development topics
Concept Modeling – Deep dive understanding of topics
Standards Development – Development of standards content
Internal Review – Targeted review
Public Review – User community review
Publication – Freely available on the CDISC website

Results: The project Standards Development and Internal Review stages completed in September 2020, resulting in the following topics available for the Public Review stage.

- Questionnaires, Ratings and Scales (including standard symptom measures, patient/investigator reported outcomes, and socio-economic measures)
- Prior and Baseline, and On-Study Treatments (including response to prior treatment)
- Disease Staging (location and phenotypic descriptions of the disease)
- Endoscopy Assessments
- Cross-section Imaging Assessments (including CT, MRI and Ultrasound)
- Histopathology of Biopsy Samples
- Biomarkers of Interest for Crohn's Disease

Conclusion: To make the greatest impact on Crohn's disease research, widespread promotion of the availability of the standards for researchers to adopt and implement to their data is of highest importance. CDISC provides complementary education courses and implementation information to assist in this adoption. Widespread adoption of the standards will bring clarity to Crohn's disease data and will enable the accessibility, interoperability, and reusability of data, driving operational efficiencies, expediting regulatory review, and reducing time to market.

DISEASE ACTIVITY, STERIOD-FREE REMISSION, AND CLINICAL OUTCOME ASSESSMENTS OF PEDIATRIC ULCERATIVE COLITIS AND CROHN'S DISEASE PATIENTS RECEIVING BIOLOGIC THERAPY

Theresa Hunter, Wendy Komocsar, Chunyan Liu, Richard Colletti, Steven Steiner, Jennifer Dotson, Keith Benkov, Nanhua Zhang, Wallace Crandall

Objectives: To assess disease activity, steroid-free remission, and clinical outcome assessments among pediatric UC and CD patients who initiated a biologic after being enrolled in the ICN registry.

Methods: Pediatric patients who were diagnosed with UC or CD between June 1, 2013-Dec 31, 2019, who, after enrollment in the ICN registry, initiated a biologic and were actively followed for at least 12 months after first maintenance dose were included in this study. Descriptive statistics of baseline patient demographics were summarized for the overall IBD patient population and separately for UC and CD. PUCAI, partial Mayo score, and PGA were assessed in UC patients; and the sPCDAI and PGA were assessed in CD patients at first maintenance dose, 1-year and 3-year time points. Kappa coefficients were used to assess the level of agreement between the PUCAI, Mayo clinical score, and PGA for UC patients and the level of agreement between the sPCDAI and PGA for CD patients at different time points.

Results: A total of 1,887 pediatric IBD patients (UC=350; CD=1,537) were included in this study. Patients had a mean age at diagnosis of 12.9 years, 57.1% were male, and 80.6% were White. Mean PUCAI scores of UC patients decreased from 12.1 at first maintenance dose, to 5.7 at 1-year, and 3.7 at 3-years; the proportion of UC patients in steroid-free remission by PUCAI increased from 46.2% at first maintenance dose, to 75.0% at 1 year and 80.4% at 3 years. The proportion of UC patients that were quiescent based on PGA also increased from 67.2% at first maintenance dose, to 84.2% at 1-year and 92.6% at 3-years. The proportion of UC patients that were in remission based on Partial Mayo score also increased from 72.1% at first maintenance dose, to 87.5% at 1-year and 92.3% at 3-years. Mean sPCDAI score of CD patients decreased from 9.5 at first maintenance dose, to 6.7 at 1-year, and 6.3 at 3-years; the proportion of CD patients in steroid-free remission by sPCDAI increased from 63.8% at first maintenance dose, to 81.2% at 1-year and 85.4% at 3-years. The proportion of CD patients who were quiescent based on PGA also increased from 69.2% at first maintenance dose, to 85.3% at 1-year and 89.6% at 3-years. In UC patients, the kappa coefficients between PUCAI and PGA ranged from 0.46–0.66, PUCAI and partial Mayo ranged from 0.52–0.72, and PGA and

Partial Mayo score ranged from 0.73–1.00 at different time points. For CD patients, the kappa coefficient between sPCDAI and PGA ranged from 0.40–0.48 at different time points.

Conclusion: This study found that disease activity scores improved over time, with more pediatric UC and CD patients achieving steroid-free remission 1-year and 3-years after first biologic maintenance dose. There was modest correlation between disease activity assessments, with the correlation between the PGA and Partial Mayo score being the strongest.

Table 1. Clinical outcome assessments for pediatric UC and CD patients at specified time points

Disease outcomes	First Maintenance dose	1-year from first Maintenance dose	3-year from first Maintenance dose	Last recorded bf dose for patients who did not discontinue
Crohn's Disease				
Short PCDAI				
N	1089	1165	280	945
Min-Max	0.0–77.5	0.0–80.0	0.0–57.5	0.0–82.5
Mean (SD)	8.3 (10.65)	6.7 (10.02)	6.3 (10.48)	6.3 (10.17)
Median (Q1, Q3)	0.0 (0.0, 15.0)	0.0 (0.0, 10.0)	0.0 (0.0, 10.0)	0.0 (0.0, 10.0)
Steroid-free remission by sPCDAI				
Yes	413 (36.2%)	220 (18.8%)	41 (14.6%)	171 (17.9%)
Yes	729 (63.8%)	949 (81.2%)	239 (85.4%)	785 (82.1%)
Missing	514	215	88	265
Disease severity status by sPCDAI				
Quiescent	770 (72.0%)	940 (82.2%)	241 (88.3%)	785 (89.8%)
Mild	175 (16.4%)	122 (10.7%)	25 (9.9%)	99 (10.3%)
Moderate/Severe	124 (11.6%)	71 (6.1%)	14 (5.0%)	53 (5.4%)
Missing	587	203	88	274
Physicians Global Assessment				
Quiescent	1120 (89.2%)	1171 (85.3%)	327 (89.6%)	1054 (87.8%)
Mild	389 (24.0%)	385 (11.9%)	28 (7.7%)	132 (9.3%)
Moderate	100 (8.2%)	38 (2.8%)	10 (2.7%)	50 (2.5%)
Severe	9 (0.4%)	1 (0.1%)		3 (0.2%)
Missing	31	11	3	10
Ulcerative Colitis				
PUCAI				
N	367	281	51	248
Min-Max	0.0-85.0	0.0-65.0	0.0-25.0	0.0-75.0
Mean (SD)	12.1 (14.34)	5.7 (10.55)	3.7 (6.23)	4.7 (9.34)
Median (Q1, Q3)	5.0 (0.0, 20.0)	0.0 (0.0, 5.0)	0.0 (0.0, 5.0)	0.0 (0.0, 5.0)
Steroid-free remission by PUCAI				
No	189 (53.8%)	71 (25.0%)	10 (19.6%)	52 (23.1%)
Yes	171 (46.2%)	213 (75.0%)	41 (80.4%)	194 (77.9%)
Missing	14	8	3	6
Disease severity status by PUCAI				
Quiescent	208 (56.7%)	217 (76.7%)	41 (80.4%)	185 (78.6%)
Mild	114 (31.1%)	56 (19.8%)	10 (19.6%)	48 (20.4%)
Moderate/Severe	45 (12.3%)	10 (3.5%)		2 (0.8%)
Missing	17	9	3	7
Physicians Global Assessment				
Quiescent	252 (87.2%)	246 (84.2%)	50 (92.6%)	218 (86.9%)
Mild	31 (10.7%)	37 (12.7%)	4 (7.4%)	29 (11.6%)
Moderate	37 (9.9%)	9 (3.1%)		3 (1.2%)
Severe	1 (0.4%)			1 (0.4%)
Missing	9			4
Partial Mayo Score				
0	315 (58.3%)	212 (74.9%)	42 (80.8%)	195 (78.3%)
1	31 (11.8%)	36 (12.7%)	6 (11.5%)	29 (11.6%)
2	56 (9.8%)	16 (5.6%)	4 (7.7%)	21 (8.5%)
3	20 (3.4%)	8 (2.8%)		4 (1.6%)
4	23 (8.2%)	8 (2.8%)		3 (1.2%)
5	12 (3.3%)	2 (0.7%)		1 (0.4%)
6	4 (1.1%)	1 (0.3%)		
7	5 (1.4%)	1 (0.3%)		
8	2 (0.5%)			
9	2 (0.5%)			1 (0.4%)
Missing	17	5	2	9
Partial Mayo Score group				
Remission	266 (72.1%)	121 (85.3%)	48 (92.3%)	224 (91.1%)
Mild	78 (21.1%)	32 (11.3%)	4 (7.7%)	20 (8.1%)
Moderate	21 (5.7%)	4 (1.4%)		1 (0.4%)
Severe	4 (1.1%)			1 (0.4%)
Missing	17	5	2	9

Table 2: Kappa coefficients between disease outcomes at the specified time points/intervals.

Patient Population	Outcomes	First Maintenance dose	1-year from first Maintenance dose	3-year from first Maintenance dose	At Discontinuation
Crohn's Disease	sPCDAI and PGA	0.43 (0.38, 0.48)	0.41 (0.35, 0.47)	0.40 (0.26, 0.55)	0.48 (0.40, 0.55)
Ulcerative Colitis	PGA and Partial Mayo Score	0.73 (0.66, 0.79)	0.70 (0.59, 0.81)	1.00 (1.00, 1.00)	0.70 (0.60, 0.81)
	PUCAI and PGA	0.55 (0.47, 0.63)	0.46 (0.35, 0.57)	0.52 (0.20, 0.84)	0.66 (0.55, 0.77)
	PUCAI and Partial Mayo Score	0.57 (0.49, 0.65)	0.54 (0.43, 0.66)	0.52 (0.20, 0.84)	0.72 (0.62, 0.83)

sPCDAI, PUCAI, PGA and Partial Mayo Score are categorized into three categories: Quiescent, Mild and Moderate/Severe

MODERATE TO SEVERE ENDOSCOPIC INFLAMMATION IS FREQUENT AFTER ACHIEVING CLINICAL REMISSION IN PEDIATRIC ULCERATIVE COLITIS

Chen Sarbagili-Shabat, Dror Weiner, Joram Wardi, Lee Abramas, Michal Yaakov, Arie Levine

Background: Pediatric ulcerative colitis (UC) is characterized by low sustained remission rates and frequent extension of disease even if clinical remission is obtained with therapy. Moderate to severe endoscopic activity is a risk factor for relapse while evidence regarding early mucosal healing or persistence of inflammation after remission in children is not available. Our aim was to evaluate if persistence of significant inflammation is common and could explain the high relapse rate in pediatric UC.

Methods: Pediatric UC patients with clinical remission, defined as pediatric UC activity index (PUCAI) scores < 10, were prospectively assessed for mucosal healing by endoscopy 3–5 months after remission was documented. Mayo score was assessed for each segment by a blinded adult gastroenterologist using central reading. Symptomatic patients prior to sigmoidoscopy were excluded Sustained remission was assessed retrospectively at 18 months follow-up.

Results: Forty-six children were enrolled, 28 children in continuous clinical remission at time of sigmoidoscopy were included in the final analysis. Mayo 0 was present in 12/28 (42.86%), Mayo 1 in 2/28 (7.1%) and Mayo 2–3 in 14/28 (50.0%) endoscopies. Among 23/28 patients with follow-up through 18 months, remission was sustained in 2/11 (18.18%) of patients with Mayo 2 and 3 versus 6/12 (50.0%) with Mayo score 0–1.

Conclusion: Over 50% of children assessed for mucosal healing 3–5 months after clinical remission is obtained have residual disease activity, primarily moderate to severe inflammation which was associated with lower sustained remission. Early sigmoidoscopy after clinical remission for assessment of mucosal disease should be considered in pediatric UC.

RESULTS FROM A NATIONAL CROSS-SECTIONAL STUDY OF DISEASE BURDEN IN CROHN'S DISEASE

Jamison Seabury, Christine Zizzi, Jennifer Weinstein, Ellen Wagner, Spencer Rosero, Nuran Dilek, Aaron Kaat, Michael McDermott, Lawrence Saubermann, Larissa Temple, Scott Rogoff, Chad Heatwole

Background: Patients with Crohn's disease experience a wide variety of clinical symptoms that affect how they feel and function. As therapeutic trials are planned for patients with Crohn's disease, it is important to better understand the symptoms that have the greatest impact on Crohn's disease patient's lives.

Objective: To identify the most common and important disease manifestations in Crohn's disease in a large population of patients. To determine the modifying factors that are associated with these symptoms.

Methods: We conducted a national cross-sectional study of 415 patients from the IBD Partners patient registry sponsored by the Crohn's & Colitis Foundation to identify the prevalence and relative importance of 148 individual symptoms across 17 unique symptomatic themes. These themes were previously identified through 16 semi-structured qualitative interviews with Crohn's patients.

Results: Crohn's disease participants provided over 55,000 symptom rating responses. The symptomatic themes with the highest prevalence in Crohn's disease were gastrointestinal issues (93.0%), fatigue (86.4%), dietary restrictions (77.9%), impaired sleep or daytime sleepiness (75.6%), and inability to do activities (72.3%). Symptomatic theme prevalence was widely associated with having above the median number of stools per day, having above the median number of bowel movements per day, having perianal disease, having to miss work, and unemployment.

Discussion/Conclusion: Crohn's disease symptoms, some under-recognized, vary based on disease characteristics and demographic features. These symptoms represent targets for future therapeutic interventions and are potential areas of interest for an upcoming disease-specific patient-reported outcome measure for this population.

Acknowledgements: Funding for this project was provided by UR Ventures. Research activities were conducted in collaboration with the Crohn's & Colitis Foundation.

ROLE OF CHEMERIN IN THE PATIENTS WITH INFLAMMATORY BOWEL DISEASES

Marcin Sochal, Jakub Fichna, Piotr Bialasiewicz, Renata Talar-Wojnarowska, Agata Gabryelska, Ewa Malecka-Panas

Background and aims: Chemerin belongs to adipokines, which are proteins secreted by white adipose tissue. It has important role in angiogenesis, metabolism and correlates with severity of inflammation. The study aimed to investigate the correlation between the serum level of chemerin and the severity of inflammatory bowel disease (IBD), and examine the influence of anti-TNF treatment on the chemerin level.

Methods: One-hundred and nineteen participants were recruited for this study: 77 with IBD and 42 healthy control (HC). Venous blood was collected from all study participants. Twenty-six patients, who underwent 14-week anti-TNF therapy were re-examined (infliximab or adalimumab). The measurements were performed by ELISA method, according to the protocol supplied by the producer. The study was funded by Medical University of Lodz Grant (#564/1-000-00/564-20-024).

Results: Serum chemerin level were higher in ulcerative colitis (UC) patients (557.4 ng/ml ±219.9) compared to Crohn's disease (CD; 446.0 ±252.6; p=0.048). IBD patients (492.3 ng/ml ±244.3) achieved higher chemerin level than HC control (404.5 ng/ml ±194.2; p=0.047). Patients with IBD exacerbation (559.1 ng/ml ±235.6) achieved higher chemerin levels compared to remission (381.7 ng/ml ±220.2; p=0.002). Chemerin correlated with the severity of the clinical condition of the CD (Harvey-Bradshaw index; r=0.478, p=0.001), but not with the severity of UC (Partial Mayo Score; r=0.03, p= 0.788). Serum level of chemerin decreased after 14 weeks of anti-TNF treatment (519.6 ng/ml IQR: 393.2–727.0 vs. 351.5 ng/ml IQR: 229.3–424.2; p=0.002). Patients treated with steroids obtained higher concentrations of chemern compared to patients who did not receive such treatment (p=0.049).

Conclusions: Chemerin correlates with the clinical severity of IBD and its level lowers after anti-TNF treatment, which suggests its participation in inflammation. However, many factors affect its concentration thus it does not seem to present high diagnostic value or present as a possible therapeutic target.

Disease Complications

A RARE AND UNFORTUNATE CASE OF PARESTHESIAS SECONDARY TO INFLIXIMAB

Neethi Dasu, Brian Blair, Yaser Khalid

Introduction: The tumor necrosis factor-α (TNF-α) antagonists infliximab, adalimumab, and etanercept have been approved for treatment of inflammatory bowel disease (IBD). We describe a rare manifestation of a demyelinating neuropathy affecting the peripheral nervous system in a patient on Infliximab for the treatment of Crohn's disease following progression of his disease.

Case Report: A 34-year-old male with a past medical history of Crohn's disease presented for progressive and worsening diffuse numbness and paresthesias over two months in almost all of his extremities except the right side of his face, his