

1033. Skin Surface Thermal Imaging to Differentiate Cellulitis and Pseudocellulitis in the Emergency Department

Michael Pulia, MD, MS¹; Rebecca Schwei, MPH²; Edward Harwick, BS²; Ambar Haleem, MD³; Jamie Hess, MD²; Robert Glinert, MD²; Thomas Keenan, MD PhD²; Joseph McBride, MD²; Robert Redwood, MD MPH⁴; ¹University of Wisconsin School of Medicine and Public Health, Madison, WI; ²University of Wisconsin Madison School of Medicine and Public Health, Madison, Wisconsin; ³University of Wisconsin School of Medicine and Public Health, Madison, WI, Madison, Wisconsin; ⁴Cooley Dickinson Health Care, Northampton, Massachusetts

Session: P-58. New Approaches to Diagnostics

Background. Cellulitis is misdiagnosed in up to 30% of cases, resulting in overuse of antibiotics. This represents a threat to patient safety and public health. Surface thermal imaging has been proposed as a tool to reduce errors in diagnosing cellulitis. The study objective was to compare skin surface temperature measurements between patients with cellulitis and pseudocellulitis.

Methods. We prospectively enrolled patients presenting to the emergency department (ED) with dermatologic lower extremity complaints that involved visible erythema. Using a thermal imaging camera, the maximum temperature value (Tmax) for the affected area of skin and corresponding area on an unaffected limb were captured. The Tmax gradient between the affected and unaffected limb was calculated. Gold standard diagnosis (cellulitis versus pseudocellulitis) was determined by consensus of a blinded, multidisciplinary physician review panel (two infectious disease, two dermatologists and two emergency medicine). Differences in temperature variables (Tmax and Tmax gradient) between cellulitis and pseudocellulitis were compared using t-tests.

Results. The sample included 204 participants, 59% male with an average age of 57 years. Based on expert panel consensus diagnosis, 92 (45%) of the participants had cellulitis. The cellulitis group had an average Tmax of 33.2°C and 30.2°C for affected and unaffected skin respectively, which was a significant difference of 2.9°C (CI: 2.5 to 3.6; p < 0.001). The difference in the Tmax gradients between patients with cellulitis and pseudocellulitis was 2.08°C (CI: 1.46-2.70; p < 0.001).

Conclusion. This represents the largest validation study of skin surface temperature differences between cellulitis and pseudocellulitis. Significant difference in temperature gradients between cases of cellulitis and pseudocellulitis suggests thermal imaging could be a useful diagnostic adjunct that can help differentiate these conditions. Such a modality could be particularly helpful in the ED setting where providers must balance diagnostic uncertainty with antimicrobial stewardship principles. Future work will identify the best performing temperature variables and determine optimal cutoff values for use in diagnostic algorithms.

Disclosures. All Authors: No reported disclosures

1034. Febrile use in Immunocompromised Patients in a Real-World Hospital Setting during the second (COVID-19) wave in Italy

Filippo Lagi, MD, MSc¹; Alessandro Bartoloni, Prof²; Catalina Suarez-Cuervo, MD³; ¹Department of experimental and clinical medicine, Florence, Toscana, Italy; ²Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy, Florence, Toscana, Italy; ³Lumos Diagnostics, Lakeland, Florida

Session: P-58. New Approaches to Diagnostics

Background. The diagnosis of acute respiratory infection (ARI) in patients with immunosuppression secondary to disease or medications is often unclear. Symptoms may be absent or blunted, and acute phase reactants, like procalcitonin (PCT) and C-reactive protein (CRP) may not elevate. For these patients, minor signs or symptoms could lead to hospitalization and antibiotic prescriptions to prevent complications or death. Febrile Dx[®] is a rapid, qualitative immunoassay test designed to distinguish between viral or bacterial respiratory infection through simultaneous detection of both CRP and Myxovirus resistance protein A (MxA) from a fingerstick blood sample.

Methods. Febrile Dx was evaluated as part of a real-world prospective, observational study in hospitalized patients with symptoms of ARI and suspected COVID-19 in a single tertiary care center in Italy (August, 2020 - January, 2021). A sub analysis of patients with expected reduced host immune responses secondary to immunosuppression by disease or medication was performed. (Classified by treating clinician; patient on high dose steroids/ immunosuppressive therapy, or underlying condition like cancer or autoimmune disease). Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and likelihood ratios were calculated for Febrile Dx with respect to the final diagnosis.

Results. We included 28 patients from 200 in the study, 16 patients had a final diagnosis of bacterial infection and 12 had viral infection. Febrile Dx showed a sensitivity of 91.7% to accurately diagnose viral infection and 93.8% for bacterial infection (see tables). Serum CRP was not available for 4 of the patients included (14%) and elevated in the remaining patients. PCT was not available for one patient with viral infection and was elevated in 50.0%.

Table 1- Results for Viral Infection

Febrile Dx Result	Viral Infection		Total
	Present	Absent	
Positive	11	0	11
Negative	1	16	17
Total	12	16	28
Sensitivity (95% CI)	91.67% (61.52 – 99.79%)		
Specificity (95% CI)	100% (79.41-100.00%)		

Table 2- Results for Bacterial Infection

Febrile Dx Result	Bacterial Infection		Total
	Present	Absent	
Positive	15	1	16
Negative	1	11	12
Total	16	12	28
Sensitivity (95% CI)	93.75% (69.77 – 99.84%)		
Specificity (95% CI)	91.67% (61.52 – 99.79%)		

Febrile Dx Performance when compared to Clinical Diagnosis

Conclusion. Febrile Dx demonstrated a higher accuracy for differentiating bacterial vs. viral infection in an immunocompromised cohort than single biomarkers CRP and PCT. Febrile Dx demonstrated a high diagnostic accuracy to differentiate viral from bacterial infection in patients with chronic immunosuppressive conditions in a real-world setting and had better performance than standalone CRP and PCT to distinguish viral and bacterial ARI in immunocompromised patients.

Disclosures. Catalina Suarez-Cuervo, MD, Lumos Diagnostics (Employee)

1035. Manufacturing Processes of SER-109, a Purified Investigational Microbiome Therapeutic, Reduce Risk of Transmission of Emerging and Undetected Infections in Donor Stool

Christopher McChalicher, n/a¹; Ahmad Abdulaziz, MS¹; Elizabeth Halvorsen, PhD¹; Mary-Jane Lombardo, PhD²; Jonathan Winkler, PhD¹; Sanabel Almomani, MS¹; Barbara McGovern, MD³; Gregory McKenzie, PhD⁴; David Ege, PhD⁴; John Aunins, PhD¹; ¹Seres Therapeutics, Cambridge, Massachusetts; ²Seres Therapeutics, Inc, Cambridge, Massachusetts; ³Seres Therapeutics, Inc., Cambridge, MA; ⁴Seres Therapeutics (Current: Prolacta Biosciences), Cambridge, Massachusetts

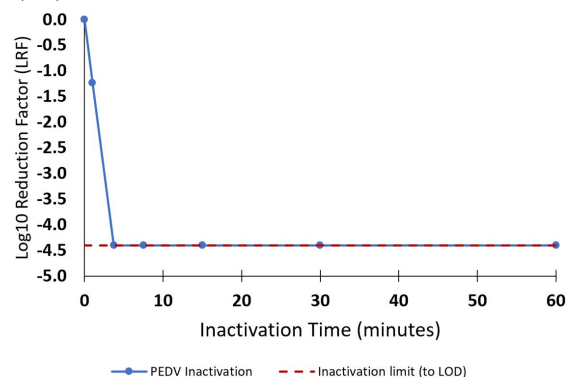
Session: P-59. New Drug Development

Background. Fecal microbiota transplantation (FMT) is vulnerable to emerging pathogens due to reliance on donor screening for risk mitigation. These concerns were highlighted by dual FDA safety alerts regarding FMT transmission of bacterial pathogens, which were recognized in hindsight only after hospitalizations and deaths. The FDA also warned of potential risk of SARS-CoV-2 transmission, leading to quarantine of FMT in March 2020, two months after COVID-19 was reported on US soil. Conversely, our development program for SER-109, an oral investigational microbiome therapeutic, was prospectively designed to inactivate organisms of concern, while purifying the hardy Firmicutes spores. We evaluated whether the manufacturing processes for SER-109 inactivate model organisms, including a coronavirus with gastrointestinal tropism, and a representative Gram-negative bacterium.

Methods. Model organisms were selected based on biologic suitability, detectability, and laboratory safety. Porcine Epidemic Diarrhea Virus (PEDV, a coronavirus) was selected to model SARS-CoV-2. Quantitation used a Vero cell tissue culture infectious dose (TCID₅₀) assay. For *E. coli*, a rifampicin-tolerant *Salmonella enterica* was selected and quantified with MacConkey lactose agar plus rifampicin. Spiking experiments into representative fecal suspensions were completed to measure inactivation of model organisms. Log-reduction factors (LRF) were calculated based on the drop in organism titer during inactivation. Hold controls in non-ethanolic test matrices were used to confirm specificity of the ethanol inactivation.

Results. In 70% v/v ethanol, PEDV was inactivated by more than 4.2 log₁₀ (to limit of detection, LOD) within 4 minutes (Fig1). In 50% v/v ethanol, *S. enterica* was inactivated by more than 6.5 log₁₀ (to LOD) within 30 seconds (Fig2).

Figure 1. Inactivation of Porcine Epidemic Diarrhea Virus (PEDV), log₁₀ reduction factor (LRF) versus time



Average of two experiments shown. Also shown is the maximum achievable inactivation based on the limit of detection (LOD).