Ileal transcriptome and serologic markers distinguish Ulcerative Colitis from Crohn's Disease

Thomas C. Westbrook[1], Yael Haberman[2], Lee A. Denson[3]

Division of Gastroenterology, Hepatology and Nutrition, Cincinnati Children's Hospital Medical Center

Background

Crohn's disease (CD) and Ulcerative Colitis (UC) are the main forms of Inflammatory bowel disease (IBD). However, there can be difficulty categorizing patients with IBD that is limited to the colon, namely UC and colon-only CD (cCD). It is estimated that 10% of patients are misclassified and an additional 5-30% of patients cannot be definitively diagnosed because of overlapping clinical features. Diagnosis drives treatment decisions and surgeries, which differ between CD and UC. In previous work an ileal gene expression signature for Crohn's disease was described. Here we build on that work to create a diagnostic model to differentiate between those IBD forms that are limited to the colon.

Aims/Hypothesis

An ileal gene expression and serologic classification system can predict clinical diagnosis with 90% accuracy in an independent group of pediatric IBD patients

Methods

RNA-seq data generated from the CCFA RISK pediatric cohort was used to create two support vector machine algorithms (SVM) (n=65, n=281). New pediatric cutoffs for six common serum IBD antibodies were determined using RISK cCD and UC patients (n=318). The two SVM algorithms together with new serologic cutoffs were validated in an independent group of 50 patients (25 CD, 25 UC). Sensitivity, specificity and positive predictive value were calculated comparing the predications to the clinical diagnosis.

Results

The sensitivity, specificity and positive predictive value for UC was 80%, 88% and 87% respectively. The sensitivity, specificity and positive predictive value for CD was 88%, 80% and 81% respectively. The overall accuracy of the classification system was 84%

Conclusions

A diagnosis system built on ileal gene expression and serology can distinguish UC from colon-only CD with overall 84% accuracy. A major challenge for this model is that the ileal gene expression profiles for patients with different clinical diagnoses are sometimes indistinguishable. Further validation is needed to examine the accuracy of this model, however, its current accuracy in distinguishing UC from cCD is higher than other available diagnostics.

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