Dorofeyev et al., Gen Med (Los Angel) 2015, 3:4
DOI: 10.4172/2327-5146.1000194

General Medicine: Open Access

Research Article Open Access

HNOD2/CARD15 and JAK2 in Ukranian Inflammatory Bowel Diseases Cohort

Dorofeyev AE[1*], Rassokhina OA[2], Kishenya MS[2], Derkach IA[3], Kiriyan EA[4] and Sabodash EE[4]

[1]National Medical University n.a. A.A.Bogomoletz, Kiev, Ukraine
[2]National Medical University n.a. M.Gorky, Donetsk, Ukraine
[3]Truskavetz Hospital Clinic, Truskavetz, Ukraine
[4]Medical Academy, Poltava, Ukraine

Abstract

Background: Genetic predisposition is the key factor for inflammatory bowel diseases (IBD). NOD2/CARD15 (nucleotide-binding oligomerization domain family, member 2) is one of the most known genes in IBD and comes for clinical practice, especially Crohn's disease (CD). For IBD predisposition analysis this gene mutations is useful and predict more aggressive disease course. NOD2/CARD15 is responsible for recognizing of pathogen-associated molecular patterns. Activation of Janus kinase-2 (JAK2) transcription pathway leads to expression of pro-inflammatory cytokines and induce immune response. JAK2 may be considered as a potential gene-candidate to IBD susceptibility. Genetic predisposition with polymorphism of NOD2/CARD15, JAK2 can play important role in pathogenesis of inflammatory bowel diseases.

Aim: to characterize genetic susceptibility to ulcerative colitis (UC), Crohn's disease (CD) in Ukranian cohort.

Materials and methods: 115 IBD patients (58.3% UC and 41.7% CD) and 22 healthy controls were recruited. Single-nucleotide polymorphism (SNP) of NOD2/CARD15 (3020insC, Gly908Arg), JAK2 (Val617Phe) were determined by polymerase chain reaction (PCR) with electrophoretic detection in 3% agarose gel.

Results: 72 (62.6%) IBD patients had NOD2/CARD15 single-nucleotide polymorphism. An association with CD for 3020insC was detected more often: 58.3% cases (p=0.001; OR=10.0; 95% CI=2.33-42.78), than with UC (37.3%, p=0.09). JAK2 mutations were revealed only in 11 (9.6%) patents with IBD and didn't show any positive interaction with IBD. The interaction with SNPs and severity of IBD was revealed for CARD15 3020 insC.

Conclusions: Important role of genetic predisposition in pathogenesis of IBD was revealed. Polymorphism of NOD2/CARD15 correlated with IBD in Ukranian cohort. More significant association with CD comparing to UC was determined for CARD15 (Gly908Arg). Patients with IBD had combined mutations of NOD2/CARD15, JAK2. Significant positive interaction between risk genes and the severity of CD and UC was determined.

Keywords: Inflammatory bowel diseases; NOD2/CARD15; JAK2

Introduction

The etiology of inflammatory bowel diseases (IBD) involves both genetic and environmental components. Genetic predisposition is the key factor for IBD [1-3]. At the same time, approximately in 50% of cases of disease incidence environmental triggers such as diet regimen and food quality, emotional stress, episodes of intestinal infections and industrial burdens are also important [2,4]. An influence of multiply combinations of environmental and non-environmental factors on health of population significantly increased in the last years. Changes of bacterial community are susceptible to different agents and can be caused by genetic and epigenetic factors. CARD15/NOD2 (nucleotide-binding oligomerization domain family, member 2) is responsible for recognizing of pathogen-associated molecular patterns play important role in innate immune host defense [2,3,5]. Activation of Janus kinase-2 (JAK2) transcription pathway leads to expression of pro-inflammatory cytokines and induce immune response and this gene may be considered as a potential gene-candidate to IBD susceptibility. Genetic predisposition with polymorphism of NOD2/CARD15, JAK2 may have an influence on changes of gut microbiome, inducing of inflammatory process in the large and small intestine, and can play important role in pathogenesis of IBD.

Aim

Aim of this research is to characterize genetic susceptibility to ulcerative colitis (UC) and Crohn's disease (CD) in Ukranian cohort.

Methods

Prospective study with 115 IBD patients (58.3% UC and 41.7% CD) has been conducted. 22 healthy controls were recruited. Investigated population was Caucasians (Ukraine). Average age was 38.3 ± 9.2 years. Diagnosis of UC and CD was based on clinical symptoms, endoscopic, X-ray examination and histological findings. Patients with CD and UC were classified according to Montreal classification [4]. Clinical severity of UC was based on Mayo score assessment [3-5]. The activity of CD was measured by Crohn's disease activity index (CDAI) [5-7]. Endoscopic examinations were carried out with visual examination of the colon mucosa and assessment of endoscopical index (EI) [6-9]. Bioptates of colon mucosa were stained by haematoxylin-eosin, alcian blue at pH 1.0 and 2.5 to determine of sulfated and non-sulfated glucosaminoglycans and glycoproteins, and goblet cells in the colon mucus layer. To characterize the mucus production the PAS-reaction

***Corresponding author:** Dorofeyev AE, Illich av.16, 83003, Donetsk, Ukraine, Tel: +380623482847; Fax: +380623868152; E-mail: dorofeyev@med.finfort.com

Received November 13, 2014; **Accepted** July 14, 2015; **Published** July 20, 2015.

Citation: Dorofeyev AE, Rassokhina OA, Kishenya MS, Derkach IA, Kiriyan EA, et al. (2015) NOD2/CARD15 and JAK2 in Ukranian Inflammatory Bowel Diseases Cohort. Gen Med (Los Angel) 3: 194. doi:10.4172/2327-5146.1000194