

ABSTRACT

Background: Based on national surveillance, Yogyakarta reached top four alcoholic in Indonesia. Alcohol is a an additive substance which commonly misuse by some people. Ethanol is one of alcohol variant and it's metabolism helped by alcohol dehydrogenase 2 (ADH2) enzyme at liver, then it becomes acetaldehyde and NADH which can trigger many diseases. Ethanol can also affect kidney function, it disturbing filtration process which causes cell and tissue damage. This research of ADH2 gene polymorphisms on alcoholic in Javanese population at Yogyakarta have to be done.

Objective: Identify ADH2 gene polymorphisms on alcoholic person in Javanese population at Yogyakarta and their effect on kidney.

Method: This research use cross sectional method on alcoholic in Javanese population at Yogyakarta. Blood sample was obtained after subject had signed informed consent. Data was being analyzed with DNA extraction, polymerase chain reaction (PCR), electrophoresis, and enzyme restriction with MaeIII. BUN Creatinine examination to evaluate kidney function, then calculate with modification of diet in renal disease (MDRD) formula to count the eGFR. Correlation between ADH2 gene polymorphisms and their effect on kidney was valued by chi-square test and odds ratio test.

Result: Based on 49 final samples, there are 11 people (22.9%) have ADH2*1/*1 gene variation type, 19 people (39.6%) have ADH2*1/*2 gene variation type, and 19 people (39.6%) have ADH2*2/*2 gene variation type. Based on odds ratio analyzed, it turns out ADH2*1/*1 gene type has 4x higher risk of kidney dysfunction than ADH2*1/*2 and has 14x higher risk than ADH2*2/*2 gene type.

Conclusion: There are three types of ADH2 gene polymorphism, ADH2*1/*1, ADH2*1/*2, dan ADH2*2/*2. Most of the alcoholic person in Javanese population have ADH2*1/*2 and ADH2*2/*2 gene variation type. ADH2*1/*1 type has 4x higher risk of kidney dysfunction than ADH2*1/*2 and has 14x higher risk than ADH2*2/*2 gene type.

Keywords: Alcohol, ADH2, genetic polymorphism, kidney, eGFR

INTISARI

LATAR BELAKANG: Angka prevalensi minum alkohol menurut provinsi DI Yogyakarta menududuki peringkat ke-4. Alkohol merupakan zat adiktif yang sering disalahgunakan. Etanol merupakan salah satu jenis alkohol. Proses metabolisme etanol dibantu oleh enzim *Alcohol dehydrogenase* (ADH2/ADH1B) di hati menjadi asetaldehid dan NADH yang dapat memicu berbagai penyakit, salah satunya ginjal karena mengganggu proses filtrasi yang dapat menyebabkan kerusakan sel dan jaringan ginjal. Penelitian Polimorfisme Gen ADH2 pada peminum alkohol Suku Jawa di Yogyakarta perlu dilakukan karena belum terdapat penelitian ini sebelumnya.

TUJUAN: Mengidentifikasi polimorfisme gen ADH2 peminum alkohol Suku Jawa di Yogyakarta dan pengaruh yang ditimbulkan pada ginjal.

METODE: Penelitian ini menggunakan desain *cross sectional* pada peminum alkohol suku jawa di Yogyakarta. Sampel darah didapatkan setelah subjek menandatangani *informed consent*. Proses analisis data dengan ekstraksi DNA, Polymerase Chain Reaction (PCR), Elektroforesis, dan Restriksi Enzim dengan MaeIII. Pemeriksaan BUN Creatinine untuk menilai fungsi ginjal. Selanjutnya, digunakan rumus MDRD untuk menilai eGFR. Korelasi polimorfisme gen ADH2 dan efeknya pada ginjal dinilai secara statistik dengan *chi-square test* dan *odds ratio*.

HASIL: Sejumlah 49 sampel, 11 orang (22,9%) memiliki tipe variasi gen ADH2*1/*1, sebanyak 19 orang (39,6%) memiliki tipe variasi gen ADH2*1/*2, dan 19 orang (39,6%) memiliki tipe variasi gen ADH2*2/*2. Berdasarkan analisis *odds ratio*, tipe gen ADH2*1/*1 meningkatkan risiko disfungsi ginjal sebanyak 4x terhadap tipe ADH2*1/*2 dan 14x terhadap tipe ADH2*2/*2.

KESIMPULAN: Ditemukan tiga jenis variasi genetik enzim ADH2, yaitu ADH2*1/*1, ADH2*1/*2, dan ADH2*2/*2. Sebagian besar peminum alkohol suku Jawa di Yogyakarta memiliki tipe variasi gen ADH2*1/*2 dan ADH2*2/*2. Tipe variasi gen ADH2*1/*1 dapat meningkatkan risiko kerusakan fungsi ginjal 4x terhadap tipe ADH2*1/*2 dan 14x terhadap tipe ADH2*2/*2.

KATA KUNCI: alkohol, polimorfisme gen, ADH2, ADH1B, ginjal, eGFR