

PENGARUH PEMBERIAN ASAM KLOROGENAT PADA MENCIT *SWISS WEBSTER* DENGAN MODEL FIBROSIS GINJAL:

Kajian terhadap Fraksi Area Miofibroblas,
Ekspresi mRNA BMP-7, dan HGF

Mohammad Salman^{1,2,3}, Junaedy Yunus¹, Dwi Cahyani Ratna Sari¹,
Nur Arfian¹, Muhammad Mansyur Romi¹

Korespondensi: msalman30000@gmail.com

¹Departemen Anatomi Fakultas Kedokteran,
Kesehatan Masyarakat, dan Keperawatan Universitas Gadjah Mada

²Mahasiswa Program Pascasarjana S2 Magister Ilmu Biomedik,

³Departemen Anatomi Fakultas Kedokteran Universitas Tadulako

INTISARI

Latar belakang: Fibrosis ginjal adalah keadaan terakumulasinya miofibroblas pada area interstisial dari tubulus. Keadaan fibrosis ginjal dapat ditemukan pada penyakit ginjal kronis. *Unilateral Ureteral Obstruction (UUO)* merupakan model representatif untuk fibrosis ginjal. Pada kondisi penyakit ginjal tubuh akan melakukan kompensasi dengan menghasilkan antifibrotik berupa *Bone Morphogenetic Protein-7 (BMP-7)* dan *Hepatocyte Growth Factor (HGF)*. Asam klorogenat diketahui memiliki efek renoprotektif dan antifibrotik.

Tujuan: Mengkaji pengaruh asam klorogenat terhadap mencit model fibrosis ginjal yang diinduksi *Unilateral Ureteral Obstruction (UUO)*.

Metode: Penelitian ini adalah penelitian kuasi eksperimental dengan rancangan *posttest only control group* dengan subjek 25 ekor mencit galur *Swiss Webster* jantan dewasa yang dibagi dalam 5 kelompok yaitu kelompok SO (*Sham Operation/kontrol*), U7 (UUO hari ke-7), U14 (UUO hari ke-14), UC7 (UUO+asam klorogenat hari ke-7) dan UC14 (UUO+asam klorogenat hari ke-14). Diperiksa fraksi area miofibroblas dengan pewarnaan IHC menggunakan antibodi α -SMA. Ekspresi mRNA BMP-7 dan mRNA HGF diperiksa dengan RT-PCR. Data yang didapat dikuantifikasi dengan perangkat lunak *ImageJ*, kemudian diolah dengan SPSS.

Hasil: Fraksi area miofibroblas pada kelompok UC7 lebih rendah daripada kelompok U7 ($p=0,009$), dan pada kelompok UC14 lebih rendah daripada kelompok U14 ($p=0,009$). Ekspresi mRNA BMP-7 pada kelompok UC7 lebih tinggi daripada kelompok U7 ($p=0,044$), dan pada kelompok UC14 lebih tinggi daripada kelompok U14 ($p=0,016$). Ekspresi mRNA HGF pada kelompok U7 tidak berbeda bermakna dengan kelompok UC7, ekspresi mRNA HGF pada kelompok UC14 lebih tinggi daripada kelompok U14 ($p=0,004$).

Kesimpulan: Pemberian asam klorogenat dapat mencegah fibrosis ginjal pada mencit *Swiss Webster* dengan model UUO melalui jalur antifibrotik.

Kata kunci: *Unilateral ureteral obstruction (UUO)*, miofibroblas α -SMA, asam klorogenat, *Bone Morphogenetic Protein-7 (BMP-7)*, *Hepatocyte Growth Factor (HGF)*.

THE EFFECT OF CHLOROGENIC ACID ON SWISS WEBSTER MICE WITH RENAL FIBROSIS MODEL:

Study about Myofibroblast Fractional Area,
mRNA BMP-7, and HGF Expression

Mohammad Salman^{1,2,3}, Junaedy Yunus¹, Dwi Cahyani Ratna Sari¹,
Nur Arfian¹, Muhammad Mansyur Romi¹

Correspondence: msalman30000@gmail.com

¹Department Anatomy Faculty of Medicine,
Public Health, and Nursing Universitas Gadjah Mada

²Student of Biomedical Science Postgraduate Program

³Departement Anatomy Faculty of Medicine Universitas Tadulako

ABSTRACT

Background: Renal fibrosis is a condition of myofibroblasts accumulation in tubular interstitial area. Renal fibrosis can be found in chronic kidney disease. Unilateral Ureteral Obstruction is a representative model for renal fibrosis. Body will compensate the condition in kidney disease by producing antifibrotic substances such as Bone Morphogenetic Protein-7 (BMP-7) and Hepatocyte Growth Factor (HGF). Chlorogenic acid is known to have renoprotective and antifibrotic properties.

Aim: To evaluate the effects of chlorogenic acids on Unilateral Ureteral Obstruction (UUO)-induced renal fibrosis mice model.

Method: This study is a quasi experimental with post test only with control group design. The subjects were 25 mature male Swiss Webster mice which were divided into 5 groups, SO (Sham Operation/Control) group, U7 (day-7 UUO+ aquadest), U14 (day-14 UUO+ aquadest), UC7 (day-7 UUO + chlorogenic acid), and UC14 (day-14 UUO + chlorogenic acid). Myofibroblast fractional area was assessed using antibody α -SMA IHC staining. BMP-7 and HGF mRNA expressions were assessed using RT-PCR. Data, obtained from the study was quantified using ImageJ and analyzed using SPSS.

Results: Myofibroblast fractional area in UC7 group was lower than myofibroblast fractional area in U7 group ($p=0.009$). Myofibroblast fractional area in UC14 group was lower than in U14 group ($p=0.009$). BMP-7 mRNA expression in UC7 group was higher than BMP-7 mRNA expression in U7 ($p=0.044$) and BMP-7 mRNA expression in UC14 group was higher than in U14 group ($p=0.016$). HGF mRNA expression in U7 was not significantly different to HGF mRNA expression in UC7. HGF mRNA expression in UC14 was higher than HGF mRNA expression in U14 ($p=0.004$).

Conclusion: Chlorogenic acid administration could prevent renal fibrosis in UUO Swiss Webster mice model through antifibrotic pathway.

Keywords: Unilateral ureteral obstruction (UUO), α -SMA myofibroblast, chlorogenic acid, Bone Morphogenetic Protein-7 (BMP-7), Hepatocyte Growth Factor (HGF).