

Relationship of Levels and Expression of Glutathione Peroxidase 1 (GPx1) in Blood and Sacrouterine Ligament Tissue in Uterine Prolapse

Hubungan Kadar Dan Ekspresi Glutathione Peroxidase 1 (GPx1) Darah dan Jaringan Ligamen Sakrouterina pada Prolaps Uteri

Crismanto Layarta¹, Yuli Trisetiyono², Putri Sekar Wiyati³, Julian Dewantiningrum⁴, Erwinanto⁵, Arufiadi Anityo Mochtar⁵

¹Obstetrics and Gynecology Department, Medical Faculty of Diponegoro University/Central General Hospital of Kariadi Semarang, Indonesia

²Fertility, Endocrinology, and Reproductive Division, Obstetrics and Gynecology Department, Medical Faculty of Diponegoro University/Central General Hospital of Kariadi Semarang, Indonesia

³Social Obstetrics and Gynecology Division, Obstetrics and Gynecology Department, Medical Faculty of Diponegoro University/Central General Hospital of Kariadi Semarang, Indonesia

⁴Maternal and Fetal Medicine Division, Obstetrics and Gynecology Department, Medical Faculty of Diponegoro University/Central General Hospital of Kariadi Semarang, Indonesia

⁵Urogynecology Division, Obstetrics and Gynecology Department, Medical Faculty of Diponegoro University/Central General Hospital of Kariadi Semarang, Indonesia

Abstract

Introduction: Research suggests that oxidative stress plays a role in uterine prolapse. Oxidative stress is caused by an imbalance between reactive oxygen species and the antioxidant system. The antioxidant system that plays the most role is glutathione peroxidase (GPx). GPx1 is an enzyme that has the largest proportion of activity in cells. GPx1 expression is decreased in the sacrouterine ligament of patients with pelvic organ prolapse. However, research regarding the relationship between serum and tissue GPx1 levels has not been carried out to date.

Objectives: Analyze the correlation between blood Glutathione Peroxidase 1 (GPx1) levels and GPx1 expression in sacrouterine ligament tissue in cases of uterine prolapse.

Methods: Analytical descriptive study with a cross-sectional design involved 30 women with uterine prolapse, aged ≥ 40 years, with a history of vaginal delivery. The dependent variables were serum GPx1 levels and semiquantitative GPx1 expression of the sacrouterine ligament. The independent variable is the degree of uterine prolapse. Analysis was carried out using the Fisher exact and Spearman test. Results are significant if $p < 0.05$.

Results: Serum GPx1 levels in 30 research subjects had a mean of 56.04 ± 63.61 U/mL, a median value of 36.4 U/mL with the smallest value being 3.9 ng/mL and the largest value being 295.13 U/mL. GPx1 expression in sacrouterine ligament tissue obtained from 30 research subjects had a mean of $0.25 \pm 0.27\%$, a median value of 0.13% with the smallest value being 0% and the largest value being 0.97%. Analysis found that there was a correlation between serum GPx1 levels and GPx1 expression in sacrouterine ligament tissue ($p=0.018$) with a moderate positive correlation level ($r= 0.429$). This means that a decrease in serum GPx1 levels will be followed by a decrease in tissue GPx1 expression.

Conclusion: There was positive correlation between serum GPx1 levels and expressions in uterine ligament tissue. But, there was no difference between serum GPx1 levels and expressions in uterine ligament tissue according to uterine prolapse degree.

Keywords: GPx1 serum, GPx1 sacrouterine ligament, uterine prolapse

ABSTRAK

LATAR BELAKANG : Penelitian menunjukkan adanya peranan stress oksidatif pada prolaps uteri. Stres oksidatif disebabkan oleh ketidakseimbangan antara sistem *reactive oxygen species* dan antioksidan. Sistem antioksidan yang paling berperan adalah glutathione peroxidase (GPx). GPx1 merupakan enzim yang memiliki proporsi aktivitas terbesar di dalam sel. Ekspresi GPx1 berkurang pada ligamen sakrouterina pada pasien dengan prolaps organ panggul. Belum ada penelitian yang menelaah hubungan antara kadar serum dan ekspresi GPx1 pada ligamen sakrouterina pada kasus prolaps uteri.

TUJUAN : Menganalisis korelasi antara kadar GPx1 darah dan ekspresi GPx1 jaringan ligamen sakrouterina pada kasus prolaps uteri

METODE : Penelitian ini merupakan penelitian deskriptif analitik dengan desain potong lintang. Jumlah subjek penelitian ini adalah 30 perempuan dengan prolaps uteri, usia ≥ 40 tahun, dengan riwayat persalinan pervaginam. Variabel terikat meliputi kadar GPx1 serum dan ekspresi kuantitatif GPx1 pada jaringan ligamen sakrouterina. Uji statistika menggunakan uji Fisher exact dan Spearman. Hasil dikatakan signifikan bila nilai $p < 0.05$.

HASIL : Kadar GPx1 serum pada 30 subjek penelitian memiliki rata-rata 56.04 ± 63.61 U/mL, dengan nilai median 36.4 U/mL, nilai terkecil adalah 3.9 ng/mL dan nilai terbesar adalah 295.13 U/mL. Ekspresi GPx1 pada jaringan ligamen sakrouterina dari 30 subjek penelitian memiliki nilai rata-rata $0.25 \pm 0.27\%$, nilai median 0.13% dengan nilai terendah 0% dan tertinggi 0.97%. Hasil analisis menunjukkan adanya korelasi antara kadar serum GPx1 dan ekspresi GPx1 jaringan ligament sakrouterina ($p=0.018$) dengan derajat korelasi positif moderat ($r= 0.429$). Penurunan kadar GPx1 serum diikuti oleh penurunan ekspresi GPx1 jaringan ligament sakrouterina.

KESIMPULAN : Terdapat korelasi positif kadar GPx1 serum dan ekspresi GPx1 jaringan ligamen sakrouterina. Tidak ada perbedaan kadar GPx1 darah dan ekspresi GPx1 jaringan ligamen sakrouterina berdasarkan derajat prolaps uteri.

Kata Kunci : GPx1 serum, GPx1 jaringan sakrouterina, prolaps uteri