

Perbedaan Ekspresi mRNA *BAX*, mRNA *BCL2*, Rasio mRNA *BAX/BCL2*, dan Indeks Apoptosis Sel Trofoblas antara Preeklamsia Awitan Dini dan Awitan Lambat

Abstrak

Latar Belakang: Preeklamsia awitan dini dan lambat memiliki karakteristik yang berbeda terkait tingkat stress oksidatif, apoptosis dan adaptasi mitokondria. Peningkatan stress oksidatif dapat menyebabkan aktivasi apoptosis jalur mitokondria. Penelitian ekspresi gen famili *BCL2* terkait apoptosis pada sel trofoblas preeklamsia awitan dini dan lambat masih sedikit dan menunjukkan hasil yang inkonsisten.

Tujuan: Menilai perbedaan ekspresi mRNA *BAX*, *BCL2*, rasio *BAX/BCL2* dan indeks apoptosis antara preeklamsia awitan dini dan lambat, serta menilai korelasi antara mRNA *BAX*, *BCL2*, rasio *BAX/BCL2* dengan indeks apoptosis.

Metode Penelitian: Merupakan studi *cross sectional* dengan sampel FFPE plasenta pasien preeklamsia awitan dini dan lambat. Penilaian ekspresi mRNA *BAX*, *BCL2* menggunakan pemeriksaan *quantitative RT-PCR*. Rasio *BAX/BCL2* merupakan hasil pembagian ekspresi mRNA *BAX* dengan *BCL2*. Indeks Apoptosis dinilai dengan ekspresi fragmentasi DNA menggunakan metode *Ligation-Mediated RT PCR*.

Hasil Penelitian: Rerata *fold change* mRNA *BAX* preeklamsia awitan dini lebih tinggi dibandingkan awitan lambat ($6,02 \pm 3,59$ vs $2,82 \pm 1,97$; $p=0,00$). Rerata *fold change* mRNA *BCL2* preeklamsia awitan dini tidak berbeda dengan awitan lambat ($31,20 \pm 17,94$ vs $31,01 \pm 27,60$; $p=0,98$). Rasio *fold change BAX/BCL2* preeklamsia awitan dini lebih tinggi dibandingkan awitan lambat ($0,39 \pm 0,78$ vs $0,14 \pm 0,13$; $p=0,01$). Rerata *cycle threshold* (CT) fragmentasi DNA preeklamsia awitan dini lebih rendah dibandingkan awitan lambat ($28,07 \pm 0,64$ vs $30,63 \pm 0,96$; $p=0,00$). Terdapat korelasi negatif lemah antara *fold change* mRNA *BAX* dengan CT fragmentasi DNA ($r=-0,30$; $p=0,02$).

Kesimpulan: Ekspresi relatif mRNA *BAX*, rasio *BAX/BCL2* dan indeks apoptosis sel trofoblas pada preeklamsia awitan dini lebih tinggi dibandingkan awitan lambat. Walaupun memiliki korelasi positif lemah, mRNA *BAX* lebih berperan dalam apoptosis plasenta preeklamsia dibandingkan mRNA *BCL2*.

Kata Kunci: mRNA, *BAX*, *BCL2*, Apoptosis, Preeklamsia.

Differences in the Expression of *BAX* mRNA, *BCL2* mRNA, *BAX/BCL2* Ratio and Apoptosis Index of the Trophoblastic Cell between Early-Onset and Late-Onset Preeclampsia

Abstract

Background: Early-onset and late-onset preeclampsia have different characteristics related to oxidative stress and mitochondrial adaptation levels. Increased oxidative stress can activate the mitochondrial pathway apoptosis. Research on apoptosis-related *BCL2* family gene expression in trophoblast cells between early-onset and late-onset preeclampsia still shows inconsistent results.

Objectives: Assess the differences in expression of *BAX*, *BCL2* mRNA, *BAX/BCL2* ratio, and apoptosis index between early-onset and late-onset preeclampsia, and assess the correlation between *BAX*, *BCL2* mRNA, *BAX/BCL2* ratio and apoptosis index of the trophoblastic cell in preeclampsia

Methods: Cross-sectional study using FFPE placenta samples of early-onset and late-onset preeclampsia. Assessment of *BAX*, *BCL2* mRNA expression using quantitative RT-PCR method. *BAX/BCL2* ratio was obtained from the division between *BAX* and *BCL2* mRNA expression. The apoptosis index was assessed by examination of DNA fragmentation expression using the ligation-mediated RT-PCR method.

Results: Early-onset has a higher mean fold change in *BAX* mRNA than late-onset preeclampsia (6.02 ± 3.59 vs 2.82 ± 1.97 ; $p=0.00$). The mean fold change of *BCL2* mRNA was not significantly different between early-onset and late-onset preeclampsia (31.20 ± 17.94 vs 31.01 ± 27.60 ; $p=0.98$). The mean *BAX/BCL2* fold change ratio of the early-onset preeclampsia was higher than that of the late-onset group (0.39 ± 0.78 vs 0.14 ± 0.13 ; $p=0.01$). Early-onset preeclampsia had lower mean cycle threshold (CT) DNA fragmentation than late-onset preeclampsia (28.07 ± 0.64 vs 30.63 ± 0.96 ; $p=0.00$). There was a modest negative correlation between fold change mRNA *BAX* and CT DNA fragmentation ($r=-0.30$; $p=0.02$).

Conclusions: The relative expression of *BAX* mRNA, ratio *BAX/BCL2*, and apoptosis index of trophoblastic cells in early-onset are higher than in late-onset preeclampsia. The relative expression of *BAX* mRNA plays a more significant function in the placental apoptotic pathway of the patient with preeclampsia, despite a modest positive association.

Keywords: mRNA, *BAX*, *BCL2*, Apoptosis, Preeclampsia.