

Ekspresi connexin43 dan caspase 3 pada kardiomiosit ventrikel kiri tikus overtraining = Connexin43 and caspase 3 expression in left ventricle cardiomyocytes of overtrained rats

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Abstrak

Latar belakang : Overtraining berdampak buruk terhadap kesehatan karena dapat menyebabkan kematian mendadak pada atlet muda. Berdasarkan data epidemiologi ditemukan bahwa kejadian kematian mendadak (sudden cardiac death) pada atlet muda, penyebab paling banyak adalah gangguan kardiovaskular. Tubuh melakukan adaptasi terhadap beban berlebih, berupa remodelling (morfologi dan elektrofisiologi).

Remodeling elektrofisiologis yaitu perubahan pada gap junction, berupa perubahan ekspresi Cx43 yang mengakibatkan gangguan penghantaran konduksi listrik. Selama latihan fisik dapat terbentuk ROS yang akan menginduksi permeabilitas mitokondria sehingga terjadi kebocoran sitokrom c, selanjutnya akan mengaktifkan kaskade apoptosis.

Metode : Penelitian ini dilakukan pada 6 jaringan kardiomiosit tikus Wistar kelompok kontrol dan overtraining. Ekspresi Cx43 dan caspase-3 diamati melalui pulasan imunohistokimia dan diukur dengan image J.

Hasil : Hasil penelitian ini menunjukkan peningkatan bermakna pada ekspresi Cx43 total overtraining (43644.57 ± 27711.03) dibandingkan kelompok kontrol (13002.37 ± 3705.41). Tidak ditemukan perbedaan bermakna ekspresi caspase-3 pada kedua kelompok meskipun diperoleh hasil lebih tinggi pada kelompok overtraining ($14.15\% \pm 10.54\%$) dibandingkan kelompok kontrol ($2,63\% \pm 3.56\%$).

Kesimpulan : Overtraining meningkatkan ekspresi Cx43 total tetapi tidak terbukti meningkatkan caspase-3 pada kardiomiosit ventrikel kiri tikus.

.....Background: overtraining has bad effect for health, overtraining can cause sudden death in young athlete, reports of sudden death incidences in young athlete claim that cardiovascular disease is the cause. The heart can face the excess load by remodeling as it's adaptation mechanism. There is 2 type remodeling, morphology and electrophysiology. Remodeling electrophysiology is a change on Cx43 expression which can interfere the heart's electrical conduction. Free radical which formed from physical exercise can induce mitochondrial permeability that lead leakage of cytochrome c, so that so that activate the apoptosis cascade.

Methods: This study conducted on 12 Wistar rat's cardiomyocytes tissue that divided into control and overtraining group. Cx43 expression and caspase-3 was observed through immunohistochemical staining and measured by image J.

Results: There was significant increase in the expression of Cx43 total overtraining (43644.57 ± 27711.03) compared to the control group (13002.37 ± 3705.41). Found no significant differences in the expression of caspase-3 in both groups although the result was higher in the group of overtraining ($14,15\% \pm 10,54\%$) compared to the control group ($2,63\% \pm 3,56\%$).

Conclusion: Overtraining increase total Cx43 expression but not proven to increase caspase-3 in the rat left ventricular cardiomyocytes.