

INTISARI

Latar Belakang: Kardiomiopati diabetik (DCM) merupakan komplikasi DM pada jantung yang menjadi penyebab kematian mayoritas penderita dengan komplikasi kardiovaskuler. Kardiomiopati didasari disfungsi metabolik jantung dimana jalur oksidasi asam lemak (CD36) berlebihan disertai tertekannya jalur glukosa (GLUT4). Disfungsi tersebut mengakibatkan inflamasi dan berimbas kelainan struktural fungsional jantung. Berbagai model latihan seperti *High Intensity Interval Training* (HIIT) dan *Moderate Intensity Continuous Training* (MICT) mulai diterapkan pada pasien karena potensinya dalam memperbaiki progresivitas komplikasi DM.

Tujuan Penelitian: Mengetahui perbedaan pengaruh latihan tipe HIIT vs MICT terhadap ekspresi mRNA GLUT4, CD36 dan NF- κ B sebagai penanda disfungsi metabolisme jantung diabetes.

Metode: Penelitian analitik kuasi eksperimental dengan rancangan *post-test only with control group design* ini menggunakan sampel sebanyak 20 tikus terbagi dalam 5 kelompok yaitu kelompok kontrol, DM 1 bulan, DM 2 bulan, DM 1 bulan dengan latihan MICT serta kelompok DM 1 bulan dengan latihan HIIT. Induksi DM tipe II dibuat dengan pemberian *High-fat Diet*, *sucrose drinking water 10%* dan injeksi Streptozotocin dosis rendah 35 mg/kgBB serta dianggap berhasil jika GDS>250 mg/dL. Pemeriksaan RT-PCR sampel jaringan ventrikel kiri dilakukan untuk mendapatkan ekspresi mRNA GLUT4, CD36 dan NF κ B. Jaringan juga dibuat preparat Hematoxylin-Eosin guna melihat gambaran histopatologisnya.

Hasil Penelitian: Pada seluruh kelompok didapatkan tidak ada perbedaan yang bermakna pada ekspresi GLUT4, CD36 dan NF κ B. Meski demikian, terdapat kecenderungan ekspresi mRNA GLUT4 menurun pada kelompok DM dan meningkat pada kelompok latihan terutama MICT. Ekspresi mRNA CD36 cenderung meningkat pada kelompok DM dan latihan dibanding kontrol. Ekspresi mRNA NF κ B cenderung meningkat pada kelompok latihan. Pada gambaran histologis kedua tipe latihan dapat memperbaiki keteraturan miofibril jantung.

Kesimpulan: Tidak ada perbedaan bermakna kedua model latihan tersebut pada ekspresi GLUT4, CD36 dan NF- κ B sebagai penanda disfungsi metabolik jantung tikus diabetes. Induksi dan durasi intervensi yang lebih lama diperlukan untuk memastikan efektivitasnya.

Kata kunci: *kardiomiopati diabetik, disfungsi metabolik, latihan aerobik, HIIT, MICT*

ABSTRACT

Background: Diabetic cardiomyopathy (DCM) is a complication of DM in the heart which is the cause of death for the majority of patients with cardiovascular complications. DCM is based on metabolic dysfunction of cardiomyocytes, where the oxidation pathways of fatty acids occur excessively, accompanied by suppression of glucose pathways. The dysfunction results in inflammation and has an impact on structural and functional abnormalities of the heart. Aerobic exercise with various models, such as HIIT and MICT, is prescribed to diabetic patients due to its potential to slow the progression of the disease and its complications.

Research Objectives: Determine the effect of HIIT vs MICT type exercise in correcting cellular metabolic dysfunction and inflammation in the heart muscle to prevent DCM progressivity.

Method: This quasi-experimental analytical study with a post-test only with control group design used a sample of 20 mice divided into five groups, namely the control group, DM 1 month, DM 2 months, DM 1 month with HIIT exercise and DM 1 month with MICT exercise. Type II DM induction was made by the administration of a high-fat diet, 10% sucrose drinking water and low dose Streptozotocin injection of 35 mg/kgBB and was considered successful if GDS>250 mg/dL. RT-PCR examination of left ventricular tissue samples was performed to obtain mRNA expression of GLUT4, CD36 and NF κ B. The tissue was also made hematoxylin-eosin preparations to see the histopathological feature.

Results: In all groups, there was no significant difference in the expression of GLUT4, CD36 and NF κ B. However, there was a tendency for GLUT4 mRNA expression to decrease in the DM group and increase in the exercise group, especially MICT. CD36 mRNA expression tended to increase in the DM and exercise groups compared to controls. NF κ B mRNA expression tended to increase in the exercise group. In the histological picture with HE painting, both types of exercises can improve the myofibril regularity of the heart.

Conclusion: There was no significant difference between the two exercise models on the improvement of metabolic dysfunction in the heart of diabetic rat. Longer induction and duration of intervention are required to ensure its effectiveness.

Keywords: diabetic cardiomyopathy, metabolic dysfunction, aerobic exercise, HIIT, MICT