

ABSTRAK

Latar Belakang: *Epigallocatechin gallate* (EGCG) dilaporkan memiliki peran sebagai agen antidiabetes dan antiinflamasi. Kombinasi antara metformin dengan EGCG diperkirakan dapat meningkatkan parameter metabolik dan glikemik lebih baik dibandingkan monoterapi metformin saja. Meski demikian, efektivitas terapi metformin dan EGCG masih belum diteliti secara menyeluruh, termasuk pada *gingival crevicular fluid* (GCF) atau cairan sulkus gingiva. Penelitian ini bertujuan untuk membandingkan kadar IL-1 β dan TNF- α antara tikus Sprague-Dawley obesitas dan diabetes dengan terapi kombinasi metformin dan EGCG dan monoterapi metformin.

Metode: Tikus Sprague-Dawley jantan dibagi menjadi empat kelompok (n=6). Kelompok kontrol sehat diberi makanan standar. Tiga kelompok diabetes mendapat induksi diabetes tipe 2 dengan diet tinggi sukrosa tinggi lemak selama 5 minggu dan suntikan streptozotocin (STZ). Satu kelompok tidak menerima pengobatan dan dua kelompok lainnya menerima larutan metformin (200 mg/kgBB) atau metformin (200 mg/kgBB) dikombinasikan dengan pengobatan EGCG (100 mg/kgBB) sekali sehari secara oral selama 4 minggu. Semua kelompok diabetes diberi diet tinggi sukrosa dan tinggi lemak selama percobaan. Sampel GCF diambil pada minggu ke-2 dan ke-4. Kadar IL-1 β dan TNF- α pada GCF diperiksa menggunakan *enzim-linked immunosorbent assay* (ELISA).

Hasil: Kelompok terapi kombinasi menunjukkan kadar IL-1 β GCF paling rendah (1.448,18 \pm 170,85 pg/ml) dan berbeda secara signifikan dibanding kelompok metformin (2.006,74 \pm 324,73 pg/ml; p<0,01), kelompok diabetes (2.097,61 \pm 325,37 pg/ml; p<0,01), dan kelompok sehat (1.876,79 \pm 238,46 pg/ml; p<0,01) pada minggu ke-4. Kadar TNF- α GCF minggu ke-4 kelompok kombinasi (333,57 \pm 56,13 ng/ml) lebih rendah dibandingkan kontrol diabetes (381,42 \pm 38,64 ng/ml; p>0,05), namun tidak terdapat perbedaan bermakna dibandingkan kelompok metformin (324,73 \pm 60,39 ng/ml; p>0,05).

Kesimpulan: Terapi metformin kombinasi EGCG memiliki efek positif dalam menurunkan kadar sitokin pro-inflamasi pada GCF subyek dengan obesitas dan DMT2 dibanding dengan monoterapi metformin.

Kata kunci: Epigallocatechin gallate, metformin, diabetes, gingival crevicular fluid, interleukin-1beta, Tumor Necrosis Factor-alpha

ABSTRACT

Background: Epigallocatechin gallate (EGCG) is reported to play a role as an anti-diabetic and anti-inflammatory agent. Combining metformin with EGCG may improve metabolic and glycaemic parameters better than metformin monotherapy alone. Nevertheless, the effectiveness of metformin and EGCG therapy has yet to be thoroughly researched, including on gingival crevicular fluid (GCF). This research purpose is to compare between pro-inflammatory cytokine levels in GCF subjects with obesity and DMT2 with EGCG combination metformin therapy and metformin monotherapy.

Methods: Male Sprague-Dawley rats were divided into four groups (n=6). A healthy control group was fed a conventional diet. Three diabetic groups received induction of type 2 diabetes with a high-sucrose high-fat (HSHF) diet for 5 weeks and injection of streptozotocin (STZ). One group received no treatment and the other two received oral metformin solution (200 mg/kgW/day) or metformin (200 mg/kgW/day) combined with EGCG solution (100 mg/kgW/day) once daily for 4 weeks. All diabetic groups were fed an HSHF diet throughout the experiment. GCF samples were taken in the 2nd and 4th week. Levels of IL-1 β and TNF- α in GCF were examined using enzyme-linked immunosorbent assay (ELISA).

Results: The combination therapy group showed the lowest IL-1 β GCF levels (1,448.18 \pm 170.85 pg/ml) and was significantly different from the metformin group (2,006.74 \pm 324.73 pg/ml; $p < 0.01$), the diabetes group (2,097.61 \pm 325.37 pg/ml; $p < 0.01$), and the healthy group (1,876.79 \pm 238.46 pg/ml; $p < 0.01$) at week 4. TNF- α GCF levels at week 4 of the combination group (333.57 \pm 56.13 ng/ml) were lower than that of diabetes control (381.42 \pm 38.64 ng/ml, $p > 0.05$), but there was no significant difference compared to the metformin group (324.73 \pm 60.39 ng/ml; $p > 0.05$).

Conclusion: EGCG combination metformin therapy had a positive effect in reducing pro-inflammatory cytokine levels in GCF subjects with obesity and DMT2 compared to metformin monotherapy.

Keywords: Epigallocatechin gallate, metformin, diabetes, gingival crevicular fluid, interleukin-1beta, Tumor Necrosis Factor-alpha