

INTISARI

Latar Belakang : Obesitas menyebabkan peningkatan adipositas visceral yang dapat memengaruhi steroidogenesis dan spermatogenesis melalui mekanisme hipogonadisme, inflamasi dan stres oksidatif. Inflamasi yang meningkat dalam jaringan adiposa dapat memicu infiltrasi makrofag dan menghasilkan sitokin pro-inflamasi seperti *Tumor Necrosis Factor alpha* (TNF- α), dan *Interleukin-6* (IL-6). Peningkatan TNF- α dapat memicu peningkatan apoptosis caspase 3 pada sel germinal. Jelatang liar (*Urtica dioica*) memiliki kandungan bioaktif yang berfungsi sebagai anti-inflamasi dan anti-oksidan serta anti apoptosis.

Tujuan : Mengkaji pengaruh ekstrak jelatang liar (*Urtica dioica*) pada testis tikus jantan obesitas terhadap ekspresi mRNA TNF- α , caspase 3 dan jumlah sel spermatogenik

Metode : Penelitian ini merupakan penelitian eksperimental dengan rancangan *Post-test only with control design* dengan subjek 25 ekor tikus *Sprague Dawley* jantan (usia 7-8 minggu, berat badan 170-200 gram) dibagi menjadi 5 kelompok, kontrol sehat (K1), kontrol sakit (K2) yang diinduksi obesitas menggunakan *High Fat and Fructose Diet* (HFFD) selama 6 minggu, kelompok D1 (125 mg/kgBB), D2 (250 mg/kgBB), dan D3 (500 mg/kgBB) sebagai kelompok intervensi jelatang liar (*Urtica dioica*). Ekstrak jelatang (*Urtica dioica*) diberikan melalui sonde selama 4 minggu. Tikus diterminasi dan dilakukan isolasi jaringan testis. Ekspresi mRNA TNF- α dan caspase 3 dinilai dengan metode PCR, jumlah sel spermatogenik dinilai dengan metode pewarnaan HE. Data dianalisis menggunakan *one way ANOVA* dan *Kruskal Wallis*. Nilai $p < 0,05$ dianggap signifikan secara statistik.

Hasil : Ekspresi mRNA TNF- α kelompok intervensi D1 ($1,18 \pm 0,08$), D2 ($1,16 \pm 0,05$) dan D3 ($1,15 \pm 0,03$) lebih rendah dibandingkan kelompok K2 ($1,20 \pm 1,14$), namun tidak berbeda nyata ($p \geq 0,05$). Ekspresi mRNA caspase 3 lebih rendah secara signifikan pada kelompok intervensi D1 ($0,79 \pm 0,15$), D2 ($0,63 \pm 0,06$) dan D3 ($0,59 \pm 0,02$) dibandingkan K2 ($1,05 \pm 0,08$) ($p \leq 0,05$). Jumlah sel spermatosit primer kelompok intervensi D1 ($36,20 \pm 7,32$) dan D3 ($40,40 \pm 11,86$) lebih tinggi dibandingkan K2 ($34,60 \pm 4,03$), namun tidak berbeda nyata ($p \geq 0,05$), jumlah spermatosit sekunder tidak ada perbedaan antar kelompok ($p = 0,170$) dan jumlah sel spermatid lebih tinggi secara signifikan pada kelompok D1 ($55,00 \pm 10,90$), D2 ($60,60 \pm 6,76$) dan D3 ($68,20 \pm 3,90$) dibandingkan K2 ($40,60 \pm 13,70$) ($p \leq 0,05$).

Kesimpulan : Pemberian ekstrak jelatang liar (*Urtica dioica*) selama 4 minggu dapat menurunkan ekspresi mRNA caspase 3 dan meningkatkan jumlah sel spermatogenik pada testis tikus jantan obesitas.

Kata Kunci : Obesitas, jelatang liar (*Urtica dioica*), anti-inflamasi, anti-apoptosis, dan sel spermatogenik.

ABSTRACT

Background : Obesity causes increased visceral adiposity which can affect steroidogenesis and spermatogenesis through the mechanisms of hypogonadism, inflammation and oxidative stress. Increased inflammation in adipose tissue can trigger macrophage infiltration and produce pro-inflammatory cytokines such as Tumor Necrosis Factor alpha (TNF- α), and Interleukin-6 (IL-6). An increase in TNF- α can trigger an increase in caspase 3 apoptosis in germ cells. Wild nettle (*Urtica dioica*) has bioactive contents that function as anti-inflammatory and anti-oxidant as well as anti-apoptosis.

Objective : To study the effect of wild nettle extract (*Urtica dioica*) in the testes of obese male rats on the expression of TNF- α mRNA, caspase 3 and the number of spermatogenic cells

Methods: This study was an experimental study with a Post-test only with control design with 25 male Sprague Dawley rats (aged 7-8 weeks, body weight 170-200 grams) divided into 5 groups, healthy control (K1), control obesity-induced illness (K2) using the High Fat and Fructose Diet (HFFD) for 6 weeks, groups D1 (125 mg/kgBW), D2 (250 mg/kgBW), and D3 (500 mg/kgBW) as the wild nettle intervention group (*Urtica dioica*). Nettle extract (*Urtica dioica*) was given through a sonde for 4 weeks. The mice were terminated and the testicular tissue was isolated. TNF- α and caspase 3 mRNA expression was assessed by PCR method, the number of spermatogenic cells was assessed by HE staining method. Data were analyzed using one way ANOVA and Kruskal Wallis. The value of $p < 0.05$ was considered statistically significant.

Results: TNF- α mRNA expression in intervention groups D1 (1.18 ± 0.08), D2 (1.16 ± 0.05) and D3 (1.15 ± 0.03) was lower than group K2 (1.20 ± 1.14), but not significantly different ($p=0.057$). Caspase 3 mRNA expression was significantly lower in intervention groups D1 (0.79 ± 0.15), D2 (0.63 ± 0.06) and D3 (0.59 ± 0.02) compared to K2 (1.05 ± 0.08) ($p=0.009$). The number of primary spermatocyte cells in the intervention groups D1 (36.20 ± 7.32) and D3 (40.40 ± 11.86) was higher than K2 (34.60 ± 4.03), but not significantly different ($p = 0.398$), the number of secondary spermatocytes did not differ between groups ($p=0.170$) and the number of spermatid cells was significantly higher in groups D1 (55.00 ± 10.90), D2 (60.60 ± 6.76) and D3 ($68, 20 \pm 3.90$) compared to K2 (40.60 ± 13.70) ($p=0.015$).

Conclusion: Administration of wild nettle (*Urtica dioica*) extract for 4 weeks can reduce caspase 3 mRNA expression and increase the number of spermatogenic cells in the testes of obese male mice.

Keywords : Obesity, wild nettle (*Urtica dioica*), anti-inflammatory, anti-apoptotic, and spermatogenic cells.