Pengaruh Pemberian L-Sikloserin terhadap Jumlah Sel Osteoklas dan Kadar Kalsium Tulang Tibia pada Tikus Ovariektomi = The Effects of L-Cycloserine on Bone Calcium Content and Number of Osteclast on Tibiae Bone of Ovariectomized Rats

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Abstrak

Osteoporosis merupakan masalah kesehatan yang dicirikan dengan menurunnya massa dan struktur tulang yang menyebabkan kerapuhan dan patah tulang. Pada penelitian sebelumnya analog L-serin H-Ser(tBu)-OMe.HCl, terbukti dapat mengatasi gejala osteoporosis dengan meningkatkan massa tulang melalui penghambatan Serine Palmitoyltransferase (SPT). Pada penelitian ini, dilakukan eksperimen secara in vivo pada analog serin yang terbukti menghambat SPT yaitu L-sikloserin. Penelitian ini menggunakan tikus putih betina Sprague-Dawley yang dibagi menjadi 6 kelompok, yaitu sham dan kontrol negatif yang diberikan 1ml NaCl 0,9%, kontrol positif diberikan natrium alendronat 1mg/kg BB/hari, serta 3 kelompok variasi dosis L-sikloserin dengan D1 0,9mg/kg BB/hari, D2 1,8mg/kg BB/hari, dan D3 3,6mg/kg BB/hari dengan injeksi intraperitoneal. Semua tikus dilakukan ovariektomi, kecuali kelompok sham dilakukan pembedahan tanpa pengambilan ovarium. Tikus dipelihara 4 minggu pasca operasi, lalu diberi perlakuan selama 28 hari. Parameter yang diukur adalah berat tulang dengan rata-rata kelompok sham 255,9±3,12mg, kontrol negatif 212,1±7,90mg, kontrol positif 268,93±11,12mg, D1 284,50±28,59mg, D2 294,73±15,96mg, dan D3 277,43±24,38mg; kadar kalsium tulang dengan sham54,93±7,72mg, kontrol negatif 44,37±4,86mg, kontrol positif 53,26±3,16mg, D1 53,73±1,22mg, D2 58,45±6,29mg, serta D3 53,35±1,62mg; serta jumlah osteoklas dihitung secara histopatologi menggunakan pewarnaan TRAP dengan hasil sham 26,6±2,88sel/lapang pandang, kontrol negatif 61,27±14,64sel/lapang pandang, kontrol positif 21,6±3,5sel/lapang pandang, D1 29,2±1,31sel/lapang pandang, D2 22,53±1,45sel/lapang pandang, dan D3 28,4±11,93sel/lapang pandang. Berdasarkan penelitian, L-sikloserin meningkatkan berat dan kadar kalsium tulang, serta dapat menurunkan jumlah sel osteoklas.

.....Osteoporosis is characterized by decreasing bone mass and bone structure, causing bone fragility and fracture. L-serine analog H-Ser(tBu)-OMe.HCl, has been known to increase BMD and inhibit Serine Palmitoyltransferase (SPT) thus inhibits osteoclastogenesis. In this study, we evaluated another L-serine analog which is SPT inhibitor, L-cycloserine. This experiment is done by using Sprague-Dawley rats, divided into 6 different groups: sham and negative control were given 1ml of NaCl 0.9%, positive control was given 1mg/kg/day of sodium alendronate and the last 3 groups D1, D2, and D3 were given 0.9mg/kg/day, 1.8mg/kg/day, and 3.6mg/kg/day of L-cycloserine respectively. Ovariectomy was performed on all groups except for sham which underwent surgery without ovarium removal. After 4 weeks of ovariectomy, rats were treated for 28 days by intraperitoneal injection. Bone mass, calcium content, and osteoclast number histopathologically counted using TRAP staining were determined after 28 days of treatment. Mean bone mass in each group are 255.9±3.12mg for sham, 212,1±7.90mg for negative control, 268.93±11.12mg for positive control, 284.50±28.59mg for D1, 294.73±15.96mg for D2, and 277.43±24.38mg for D3. Mean calcium content in each group are 54.93±7.72 mg for sham, 44.37±4.86 mg for negative control, 53.26±3.16 mg for positive control, 53.73±1.22 mg for D1, 58.45±6.29 mg for D2, and

53.35±1.62 mg for D3. Mean of osteoclast numbers in cell/microscopic field of view are 26.6±2.88, 61.27±14.64, 21.6±3.5, 29.2±1.31, 22.53±1.45, 28.4±11.93 for sham, negative control, positive control, D1, D2, and D3 groups respectively. The results showed that L-cycloserine increases bone mass and calcium content, and reduces the number of osteoclasts.