Pengaruh Pemberian Kombinasi Aspirin dan Kalsium terhadap Kadar Kalsium pada Tulang Tibia Tikus Ovariektomi = The Effect of Combination of Aspirin and Calcium on Calcium Levels of Tibia Bone Ovariectomized Rats

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Abstrak

Osteoporosis adalah penyakit yang ditandai dengan adanya penurunan massa tulang yang parah sehingga meningkatkan risiko terjadinya retak atau patah tulang. Penelitian sebelumnya menunjukkan bahwa pemberian aspirin dosis tinggi (300 mg) terbukti dapat menurunkan kadar Sphingosine-1-Phosphate (S1P) dalam plasma. Kadar rendah S1P dalam darah dapat mengaktifkan S1PR1 yang dapat mengarahkan prekursor osteoklas kembali ke darah sehingga proses osteoklastogenesis dapat terhambat. Penelitian ini dilakukan untuk mengevaluasi pengaruh pemberian aspirin dengan kombinasi kalsium secara in vivo. Penelitian ini menggunakan tikus putih betina Sprague-Dawley yang dibagi menjadi 8 kelompok, yaitu sham dan kontrol negatif yang diberikan 1ml CMC Na 0,5%, kontrol positif diberikan tamoksifen sitrat 3,6 mg/200 g BB/hari, kelompok aspirin diberikan aspirin 5,4 mg/200 g BB/hari, kelompok kalsium diberikan kalsium sitrat 15 mg/200 g BB/hari, serta 3 kelompok variasi dosis aspirin dalam kombinasi dengan kalsium sitrat yaitu D1 aspirin 1,8 mg/200 g BB/hari, D2 aspirin 5,4 mg/200 g BB/hari, D3 aspirin 16,2 mg/200 g BB/hari dimana ketiga variasi dosis tersebut dikombinasikan dengan dosis kalsium sitrat 15 mg/200 g BB/hari secara peroral. 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 pertama yang diukur adalah berat tulang tibia dengan rata-rata kelompok sham 321,90 ± 10,39 mg, kontrol negatif 272,300 ± 54,18 mg, kontrol positif 312,50 ± 40,86 mg, aspirin 336,67 mg, kalsium 335, 90 ± 60,66 mg, D1 346,27 ± 83,90 mg, D2 377,00 ± 36,10 mg, dan D3 336,67 ± 4,5 mg. Parameter kedua yang diukur adalah kadar kalsium dengan rata-rata kelompok kelompok sham 111,08 ± 4,74 mg, kontrol negatif 89,30 ± 23,94 mg, kontrol positif 109,69 ± 20,25 mg, aspirin 123,01 ± 17,98 mg, kalsium 124,53 ± 32,11 mg, D1 120,19 ± 3,63 mg, D2 149,22 ± 17,13 mg, dan D3 121,60 ± 5,21 mg. Berdasarkan penelitian, pengaruh pemberian dosis kombinasi aspirin 5,4 mg/200 g BB/hari dan dosis kalsium 15 mg/200 g BB/hari pada tikus dapat meningkatkan berat dan kadar kalsium tulang tibia secara efektif.

.....Osteoporosis is a disease characterized by a severe decrease in bone mass that increases the risk of fractures. Previous studies have shown that high-dose aspirin (300 mg) has been shown to reduce plasma levels of Sphingosine-1-Phosphate (S1P). Low levels of S1P in the blood can activate S1PR1 which can direct osteoclast precursors back to the blood so that the process of osteoclastogenesis can be inhibited. This study was conducted to evaluate the effect of aspirin and calcium combination in vivo. This study used female Sprague-Dawley rats which were divided into 8 groups, namely sham and negative control which were given 1ml CMC Na 0.5%, positive control was given tamoxifen citrate 3.6 mg/200 g BW/day, aspirin group was given aspirin. 5.4 mg/200 g BW/day, the calcium group was given calcium citrate 15 mg/200 g BW/day, as well as 3 groups with variations in the dose of aspirin in combination with calcium citrate, namely D1 aspirin 1.8 mg/200 g BW/day, D2 aspirin 5.4 mg/200 g BW/day, D3 aspirin 16.2 mg/200 g BW/day where the three variations of the dose were combined with a dose of calcium citrate 15 mg/200 g

BW/day. All rats were ovariectomized, except for the sham group which underwent surgery without removing the ovaries. After 4 weeks of ovariectomy, rats were treated for 28 days orally. The first parameter that was measured was the mass of the tibia bone with the average for bone mass in each group are 321.90 ± 10.39 mg for sham group, 272.300 ± 54.18 mg for negative control, 312.50 ± 40.86 mg for positive control, 336.67 mg for aspirin group, 335, 90 ± 60.66 mg for calcium group, 346.27 ± 83.90 mg for D1, 377.00 ± 36.10 mg for D2, and 336.67 ± 4.5 mg for D3. The second parameter measured was calcium levels with the average for calcium levels in each group are 111.08 ± 4.74 mg for sham group, 89.30 ± 23.94 mg for negative control, 109.69 ± 20.25 mg for positive control, 123.01 ± 17.98 mg for aspirin group, 124.53 ± 32.11 mg for calcium group, 120.19 ± 3.63 mg for D1, 149.22 ± 17.13 mg for D2, and 121.60 ± 5.21 mg for D3. Based on the research, the effect of a combination dose of aspirin 5.4 mg/200 g BW/day and calcium dose 15 mg/200 g BW/day in rats can increase the weight and calcium levels of the tibia bone effectively.