

RINGKASAN

PENGARUH PEMBERIAN LARUTAN TIMBAL ASETAT TERHADAP BERAT DAN FOLIKULOGENESIS PADA OVARIUM MENCIT (*Mus musculus*)

LULUK WIDARTI

Timbal (Pb) diketahui tidak mempunyai kegunaan bagi tubuh kita melainkan sangat beracun dan dapat terjadi penumpukan dalam tubuh. Sumber timbal diantaranya adalah air yang tercemar oleh limbah industri dan air yang melewati saluran air yang pipanya mengandung timbal. Pemaparan timbal dalam dua bentuk yaitu organik dan inorganik. Bentuk organik misalnya Tetra Methyl Lead yang dapat berasal dari limbah perindustrian, asap kendaraan, insektisida, asap rokok, tumbuh-tumbuhan yang tumbuh di tanah yang mengandung tinggi timbal. Sebagian besar timbal dalam bentuk ini dapat diserap melalui kulit, akan tetapi unsur timbal dan senyawa timbal inorganik diserap secara ditelan atau dihirup.

Penyerapan melalui saluran gastrointestinal sangat bervariasi, tergantung pada usia misalnya anak-anak mengabsorpsi rata-rata 50% dari yang mereka makan, akan tetapi pada usia dewasa hanya sekitar 10 – 20% dari yang mereka makan. Timbal sebagai racun memiliki ikatan di membran sel dan mitokondria, melakukan interverensi dengan mitokondria, oksidatif posporasi. Timbal juga mempengaruhi sodium potasium dan kalsium ATP-A-SE pumps yang mempertahankan konsentrasi gradien ion-ion. Timbal juga berikatan dengan kation, terutama kalsium, besi dan seng. Hal ini mempengaruhi ikatan dengan pompa sodium – potasium – adenosin triposphate ($\text{Na}^+/\text{K}^+ - \text{A} + \text{P}$). Manifestasi klinis keracunan timbal disebut plumbisme. Keracunan akut timbal ditandai oleh rasa haus dan lidah terasa logam, *nausea* dan muntah, kolik, diare, konstipasi.

Penelitian ini bertujuan mengetahui pengaruh pemberian timbal asetat terhadap berat dan folikulogenesis pada ovarium mencit (*Mus musculus*). Penelitian ini berupa penelitian eksperimen laboratorium dengan rancangan penelitian berupa *post test only control group design* sejumlah 65 mencit betina berusia sekitar 8 minggu (strain balb/c) dibagi menjadi 5 kelompok, berisi 13 mencit kelompok 1 dijadikan kelompok kontrol, kelompok 2 diberikan timbal asetat 25 mg/kg BB perhari, kelompok 3 diberikan 50 mg/kg BB perhari, kelompok 4 diberikan 75 mg/kg BB perhari, kelompok 5 diberikan 100 mg/kg BB perhari. Dalam pelaksanaan pemberian perlakuan per oral menggunakan sonde selama 30 hari. Pengamatan yang dilakukan adalah menimbang berat ovarium dan menghitung jumlah folikel.

Hasil perhitungan berat ovarium dengan uji anova menunjukkan adanya perbedaan antara kelompok kontrol dengan kelompok perlakuan (F hitung = 5,004, P = 0,002) dengan P < 0,05 dan hasil uji LSD untuk menunjukkan adanya pasangan kelompok yang memiliki perbedaan signifikan adalah K1 dan K4 (P =

0,019), K1 dan K5 ($P = 0,001$), K2 dan K4 ($P = 0,014$), K2 dan K5 ($P = 0,001$), K3 dan K4 ($P = 0,046$), K3 dan K5 ($P = 0,004$).

Hasil perhitungan folikel primer dan sekunder tidak ada perbedaan yang bermakna $P > 0,05$. Hasil perhitungan jumlah folikel tersier dengan uji anova menunjukkan adanya perbedaan antara kelompok kontrol dengan kelompok perlakuan (F hitung = 6,931, $P = 0,0001$) dengan $P < 0,05$.

Hasil uji LSD untuk menunjukkan adanya pasangan kelompok yang memiliki perbedaan signifikan adalah K1 dan K4 ($P = 0,028$), K1 dan K5 ($P = 0,0001$), K2 dan K4 ($P = 0,010$), K2 dan K5 ($P = 0,0001$), K3 dan K4 ($P = 0,003$), K3 dan K5 ($P = 0,0001$).

Hasil penghitungan jumlah folikel de Graaf dengan uji anova menunjukkan adanya perbedaan antara kelompok kontrol dengan kelompok perlakuan (F hitung = 33,545, $P = 0,0001$) dengan $P < 0,05$ dan hasil uji LSD untuk menunjukkan adanya pasangan kelompok yang memiliki perbedaan signifikan adalah K1 dan K3 ($P = 0,0001$), K1 dan K4 ($P = 0,0001$), K1 dan K5 ($P = 0,000$), K2 dan K3 ($P = 0,043$), K2 dan K4 ($P = 0,000$), K2 dan K5 ($P = 0,0001$), K3 dan K4 ($P = 0,004$), K3 dan K5 ($P = 0,0001$), K4 dan K5 ($P = 0,0001$).

Uji Korelasi membuktikan bahwa terdapat korelasi negatif yang bermakna antar dosis timbal asetat terhadap berat ovarium ($r = -0,463$), jumlah folikel tersier ($r = -0,474$) dan jumlah folikel de Graaf ($r = -0,824$), namun tidak ada pengaruh dosis timbal asetat terhadap jumlah folikel primer dan sekunder.

Penelitian ini telah membuktikan bahwa pemberian timbal asetat dapat mempengaruhi penurunan berat ovarium, jumlah folikel tersier dan de Graaf.

SUMMARY

THE EFFECT OF PLUMBUM ACETATE ON WEIGHT AND FOLLICULOGENESIS OF MICE'S (*Mus musculus*) OVARY

LULUK WIDARTI

Plumbum (Pb) Acetate or lead has no known biological function, and is highly toxic and accumulates in human being. Lead's sources are: leaded points, water channeled through old water distribution systems, painting, making the glaze for ceramics, and making stained glass levels of lead. Exposure to organic lead substances such as tetra ethyl and tetra methyl lead may occur in some industries, an antiknock (tetraethyl lead) additive to gasoline, some insecticides, and is found in cigarette smoke, foodstuff (particularly green leafy vegetables) growing on soil where lead is present.

Elemental lead and inorganic lead compounds are absorbed by ingestion or inhalation, but organic lead compounds e.g. tetraethyl lead may also be absorbed by skin contact. Gastrointestinal absorption of lead varies with the age of the individual; children absorb around 50% of what they ingest, but adults only absorb 10-20% of what they ingest.

Lead is toxic as it has an affinity for cell membranes and mitochondria, and interferes with mitochondria oxidative phosphorylation. It also affects sodium, potassium and calcium ATP-ase pumps, which maintain the cells concentration gradients of these ions. Lead also interacts with essential cations, particularly calcium, iron and zinc; it interferes with the sodium - potassium - adenosine triphosphate (Na^+/K^+ - ATP) pump; and it alters cellular and mitochondria membranes, thereby increasing cellular fragility.

The clinical manifestations of lead toxicity are called plumbism. Acute lead poisoning may have effects on the following systems: Alimentary system: thirst and metallic taste, nausea and vomiting, colic, diarrhea, constipation; Central nervous system: parasthesia, muscle pain, fatigue, convulsions, cardiovascular system: hypotension, circulatory collapse; Blood: severe anemia (acute haemolytic crisis); Renal system: Oliguria, a generalized dysfunction proximal tubular. Negative effect on the reproductive system, causing low sperm count and abnormal sperm morphology on men and infertility, menstrual irregularity, spontaneous abortion, decreased libido in women.

The purpose of this study is to know how the effect of plumbum acetate (lead) administration on weight and folliculogenesis of mice's (*Mus musculus*) ovary.

The design is Post Test Only Control Group Design was a laboratory experimental study using Post Test Only Control Group Design. A number of 65 female 8 weeks old BALB/C strain mice (*Mus musculus*) were divided into five groups, each comprising 13 mice. Group 1 served as control group, group 2 was given plumbum acetate 25 mg/BW/day, group 3 was given 50 mg/BW/day, group

4 was given 75 mg/BW/day, group 5 was given 100 mg/BW/day. Treatment is given orally using sonde for 30 days.

Result of ovary weight with anova test show there is significant difference between control group and treatment group (F count = 5.004; P = 0.002) P < 0.005). LSD result are K1 and K4 (P = 0.019), K1 and K5 (P = 0.001), K2 and K4 (P = 0.014), K2 and K5 (P = 0.001), K3 and K4 (P = 0.046), K3 and K5 (P = 0.004).

Result of primary and secondary follicles there is no significant difference P>0.05. Result of tertiary follicle with ANOVA test show there is significant difference between control group and treatment group (F count = 6.931, P = 0.000) P < 0.05. LSD result are K1 and K4 (P = 0.028), K1 and K5 (P = 0.001), K2 and K4 (P = 0.010), K2 and K5 (P = 0.000), K3 and K4 (P = 0.003), K3 and K5 (P = 0.000).

Result of Graaffian follicle with ANOVA test show there is significant between control group and treatment group (F count = 33.545; P = 0.000) with P < 0.05. LSD result are K1 and K3 (P = 0.000), K1 and K4 (P = 0.000), K1 and K5 (P = 0.000), K2 and K3 (P = 0.000), K2 and K4 (P = 0.000), K2 and K5 (P = 0.000), K3 and K4 (P = 0.004), K3 and K5 (P = 0.000), K4 and K5 (P = 0.000).

Correlation test prove that there is significant negative correlation between doze plumbum and ovary weight ($r = -0.463$), count of tertiary follicle ($r = -0.474$) and count of Graaffian follicle ($r = -0.824$). But there is no effect of plumbum doze with the count of primary and secondary follicle.

This study prove that exposure plumbum acetate can effect decreasing of ovary weight , count of tertiary and Graaffian follicles.

ABSTRACT**THE EFFECT OF PLUMBUM ACETATE ON WEIGHT AND FOLLICULOGENESIS OF MICE'S (*Mus musculus*) OVARY****Luluk Widarti**

Plumbum Acetate or lead is a heavy metal classified B3 (danger and poison) that used and found in daily. Accumulated plumbum may effect to organs. This study is to determine the effect of plumbum administration on weight and folliculogenesis of mice's ovary. This is a laboratory experimental study with *Post Test Only Control Group* Design. 65 mice (*mus musculus*) strain BALB/C is divided into five groups. First group as a control, and others are given plumbum: 25mg/kgBW, 50mg/kgBW, 75mg/kgBW, and 100mg/kgBW per day for one month.

Result is significantly between control and treatment groups for ovary weight with ANOVA test ($p=0.002$). LSD result are K1 and K4 ($p=0.019$), K1 and K5 ($p=0.001$), K2 and K4 ($p=0.0014$), K2 and K5 ($p=0.001$), K3 and K4 ($p=0.046$), K3 and K5 ($p=0.004$). result of primary and secondary follicle, there are no significant difference $p>0.005$.

Result of tertiary follicle with ANOVA test there is significant difference between control group and treatment groups ($p=0.000$). LSD result are K1 and K4 ($p=0.028$), K1 and K5 ($p=0.001$), K2 and K4 ($p=0.010$), K2 and K5 ($p=0.000$), K3 and K4 ($p=0.003$), K3 and K5 ($p=0.000$). Result of Graaffian follicle with ANOVA test, there is significant difference between control and treatment groups ($p=0.000$). LSD result are K1 and K3 ($p=0.000$), K1 and K4 ($p=0.000$), K1 and K5 ($p=0.000$), K2 and K3 ($p=0.043$), K2 and K4 ($p=0.000$), K2 and K5 ($p=0.000$), K3 and K4 ($p=0.004$), K3 and K5 ($p=0.000$), K4 and K5 ($p=0.000$). In conclusion plumbum administration can effect on weight and the count of tertiary and Graaffian follicles of mice's ovary.

Key words: plumbum acetate, poison, ovary, follicle.