

Antioxidantes enzimáticos en el tratamiento con gentamicina*

De la Cruz Rodríguez, Lilia C.; Del Sanzio, Elsa E.; Posleman, Sara E.

Instituto de Bioquímica Aplicada. Facultad de Bioquímica, Química y Farmacia. Universidad Nacional de Tucumán, Diagonal 9 N° 1025 (B° PADILLA). 4000 San Miguel de Tucumán. TEL: 081-345233-FAX: 54-81-216513. Tucumán. República Argentina.

RESUMEN: En la eliminación renal de muchas drogas, el epitelio capilar renal se encuentra expuesto a su acción nefrotóxica, tal es el caso de los aminoglucósidos.

Estudios recientes sugieren que los metabolitos reactivos del oxígeno (ROM) serían mediadores de injuria tisular isquémica. En condiciones fisiológicas los ROM están regulados por enzimas con capacidad antioxidante.

En este trabajo se estudiaron los antioxidantes enzimáticos: superóxido dismutasa (SOD), glutatión peroxidasa (GPx) y glutatión reductasa (GR) en 31 pacientes tratados con gentamicina (160 mg / 12 hs / 7 días). Los valores fueron tomados sin gentamicina (basal) y al 7º día de tratamiento (GENTA). Los valores obtenidos para GPx fueron: (basal) $\bar{x} = 58,957 \pm 5,811$ U/g Hb, (GENTA) $\bar{x} = 39,178 \pm 5,78$. Para GR (basal) $\bar{x} = 73,080 \pm 5,50$ U/gHb y (GENTA) $\bar{x} = 53,380 \pm 7,0$. La diferencia fue estadísticamente significativa para ambas enzimas $p < 0,001$. El malondialdehído (MDA) fue medido como marcador de lipoperoxidación, observándose valores (basal) $\bar{x} = 1,119 \pm 0,115$ y (GENTA) $\bar{x} = 4,093 \pm 0,395$ % $\mu\text{mol/l}$ siendo el aumento con (GENTA) significativo $p < 0,001$. La funcionalidad renal se alteró con (GENTA) con un clearance de creatinina de $\bar{x} = 54,86 \pm 21,35$ ml/min y basal $\bar{x} = 127,60 \pm 13,74$ p < 0,05.

De estos resultados se concluye que la gentamicina provoca un aumento de lipoperoxidación acompañado de una disminución de enzimas antioxidantes, lo que llevaría a los cambios funcionales renales observados.

SUMMARY: Kidneys constitute the main excretory way of many antibiotics, not only through filtration but also as a result of tubular transport. Therefore, the wide area of glomerular capillary endothelium is exposed to high concentrations of antimicrobial drugs which cause very important side effects such as nephrotoxicity. It is known that, on small scale, in all cells, lipoperoxidation is produced which consist of the oxidative conversion of unsaturated fatty acids into lipid hydroperoxides. The aim of this work was to study superoxide dismutase (SOD), glutatión peroxidase (GPx) and glutatión reductase (GR) in patients treated with gentamicine via intramuscular. Malondialdehyde (MDA) was measured as indicator of lipoperoxidation. Blood samples from 31 patients suffering from different non-renal pathologies were studied. MDA, SOD, GPx and GR values were monitored before administration of 160 mg of gentamicine every 12 hours during 7 days (basal sample) and on the 7th day. It was found that MDA levels were significantly higher on the 7th day of treatment ($\bar{x} = 4,093 \pm 0,395$ $\mu\text{mol/l}$) than the basal samples ($\bar{x} = 1,119 \pm 0,115$). GPx levels were significantly lower ($\bar{x} = 39,178 \pm 5,78$ U/g Hb) and basal ($\bar{x} = 58,957 \pm 5,811$). GR levels were significantly lower ($\bar{x} = 53,380 \pm 7,0$) and basal ($\bar{x} = 73,080 \pm 5,50$ U/g Hb).

Significant differences in SOD levels between both groups were not found. The renal functionality was modified in patients treated with (GENTA), it was found a clearance of creatinine value $\bar{x} = 54,86 \pm 21,35$ ml/min and basal value $\bar{x} = 127,60 \pm 13,74$ p < 0,05. Of these results is concluded that gentamicine would cause a lipoperoxidation increase accompanied of decrease antioxidants enzymes levels, being able to be cause of the observed functional changes.