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Reducing renal uptake of ^{111}In-DOTATOC: A comparison among various basic amino acids

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Purpose: Several studies have reported significant renal toxicity after the use of a high dose of ^{90}Y-DOTATOC. Thus, renal protection is necessary in treatments with ^{90}Y-DOTA Tyr3-octreotide (DOTATOC). The infusion of certain positively charged amino acids has been shown to effectively reduce renal uptake of DOTATOC. In this study, we compared the effectiveness of three kinds of amino acids, D-lysine (lysine), L-arginine (arginine) and histidine, on renal protection in healthy rats and tried to determine which one was the most effective. ***Methods:*** Twenty SD healthy male rats were divided into 4 groups: lysine, histidine, arginine, and control. The rats were injected with a dose of 400 mg/kg of amino acid or 2 m*l* of phosphate-buffered saline (PBS) (as control) intraperitoneally. All rats were sacrificed at 4 hrs after the injection of 1 MBq ^{111}In-DOTATOC. Samples of the kidney were taken and weighed carefully. The counts of radioactivity were measured by a gamma counter and renal concentrations were calculated and expressed as percent injected dose per gram (% ID/g). ***Results:*** The renal uptake of ^{111}In-DOTATOC was significantly lower for all three kinds of amino acids when compared to the control group. The renal uptake of ^{111}In-DOTATOC in the lysine group was significantly lower than those in the histidine and arginine groups. The renal uptake of ^{111}In-DOTATOC in the histidine group was lower than that in the arginine group, but no statistical difference was noted. ***Conclusion:*** Among these three amino acids, lysine had the best reduction rate of renal uptake of DOTATOC. Histidine was more effective than arginine but no statistical difference was noted.

Key words: DOTATOC, indium-111, lysine, histidine, arginine