AFZELIN INDUCES ACUTE AND PROLONGED DIURETIC EFFECTS IN NORMOTENSIVE AND HYPERTENSIVE RATS

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INTRODUCTION

Previous studies by our research group have demonstrated that Bauhinia forficata Link leaves, commonly known as cow's paw, widely used in Brazil's folk medicine for diabetes, heart and kidney diseases, and its main chemical constituent, kaempferitrin, have diuretic and saluretic effects. For that, we aimed to evaluate the effects of afzelin, an active product from kaempferitrin metabolism, in acute and prolonged diuretic assay and calcium oxalate (CaOX) crystallization.

MATERIAL AND METHODS

Female normotensive (NTR) and hypertensive rats (SHR) were used (CEUA approval number 008/18). For acute diuresis, animals received a single oral treatment with vehicle (VEH; water 10 mL/kg), standard diuretics or afzelin (AFZ; 0.01-1 mg/kg). For prolonged diuresis, NTR and SHR were orally treated once a day with VEH, hydrochlorothiazide (HCTZ; 10 mg/kg) or AFZ (0.1 mg/kg), for 7 days. On both protocols, cumulative urine was used to measure electrolytes excretion. On 7th day, urine, blood and kidneys were collected for posterior analyzes.

RESULTS

AFZ, at doses of 0.1 and 1 mg/kg, was able to increase urine volume excretion of rats since the first hour, an effect associated with an augment of urinary Cl⁻ excretion. When AFZ was combined with L-NAME, it became more effective, but combined with HCTZ or amiloride, it did not result in a significant increase on its diuretic effect. Nevertheless, the pre-treatment with atropine or indomethacin fully avoided AFZ-induced diuresis. In addition, AFZ was able to induce prolonged diuretic effects in both NTR and SHR. Regarding electrolytes excretion, AFZ induced an increase of urinary Na⁺ excretion in NTR and Cl⁻ in both NTR and SHR, while decreased the excretion of Ca²⁺. ROS and nitrite were increased in VEH-treated SHR kidneys samples when compared to NTR, and both treatments with HCTZ or AFZ were able to modulate these effects to levels similar to those obtained with VEH-treated NTR group. Histological analysis on VEH-treated SHR kidneys showed an increased glomerular size, thickening of Bowman's capsule and derangement of the mesangial space, when compared with the vehicle-treated NTR. On the other hand, these alterations were present in minor extensions after the treatment with HCTZ and AFZ. Moreover, in the cumulative urine from AFZ-treated animals, it was possible to observe that CaOX crystallization was inhibited by 41.29% (NTR) and 92.52% (SHR).

CONCLUSIONS

In conclusion, this study shows that AFZ exerted both acute and prolonged diuretic action plus preventive effects on urinary CaOX formation.

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