Yohimbine ameliorates lipopolysaccharide-induced acute kidney injury in rats

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Sepsis-induced acute kidney injury (AKI) is frequently observed in the intensive care unit. We previously revealed that yohimbine, α2-adrenoceptor antagonist, has protective effect against renal ischemia/reperfusion injury-induced AKI in rats. This study aimed to investigate the renoprotective effect of yohimbine against lipopolysaccharide (LPS) -induced AKI in rats. Male Sprague Dawley rats were randomly divided into following groups: Sham-operated group, LPS (10 mg/kg, i.p.), LPS + yohimbine (0.1 or 0.5 mg/kg, i.p.). Kidney functional parameters of blood urea nitrogen (BUN), plasma creatinine (Pcr) were aggravated in LPS group. Administration of LPS decreased mean arterial blood pressure. In addition, kidney injury molecule-1, iNOS and various cytokine expression such as TNF-α, MCP-1 and IL-6 were increased by LPS administration. The treatment with yohimbine clearly ameliorated damaged kidney function and blood pressure due to LPS. Moreover, yohimbine suppressed cytokine mRNA and iNOS expression enhanced by LPS. However, anti-inflammatory cytokine IL-10 mRNA levels were augmented by yohimbine. NF-kB nuclear translocation in kidney was observed 1 hr after injection of LPS in rats. Yohimbine blocked nuclear entry of NF-kB. In addition, phosphorylation of ERK and CREB were enhanced with yohimbine. These results suggest that yohimbine can prevent LPS-induced sepsis associated with kidney injury by suppressing the inflammatory cytokine expression and enhancement of IL-10 expression via ERK/CREB phosphorylation.