AB045. Therapeutic potential of Icariin in combination with PDE5 inhibitor on penile atrophy and erectile dysfunction in a rat model of post-prostatectomy

Yongde Xu

Department of Urology, Beijing Friendship Hospital, Capital Medical University, Beijing 100050, China

Background: The commonly utilized phosphodiesterase type 5 (PDE5) inhibitors does not lead to satisfactory penile erection after radical prostatectomy due to lack of nitric oxide (NO) released from the damaged cavernous nerves (CNs). The aim of this study was to assess the efficacy and mechanisms of Icariin (ICA) in combination with daily sildenafil on penile atrophy and neurogenic erectile dysfunction (ED) in a rat model of bilateral CNs injury (BCNI).

Methods: Sixty male Sprague-Dawley rats injected with 5-ethynyl-2-deoxyuridine (EdU; 50 mg/kg) at newborn. Forty-eight rats of BCNI were randomized equally into gavage feeding of vehicle, sildenafil (10 mg/kg), ICA (1.5 mg/kg) and sildenafil + ICA, respectively. Twelve sham-operated rats served as control. Erectile function was assessed and histologic/molecular analyses were performed at 5 weeks after surgery. The intracavernous pressure (ICP) and mean arterial pressure (MAP) was measured and mid-penile cross-sections were histologically examined. Western blotting of cavernous tissue protein was performed. The data were analyzed using one-way analysis of variance followed by the Tukey-Kramer *t*-test.

Results: Animals that received sildenafil + ICA had significantly higher mean ICP/MAP ratio relative to all other rats with BCNI ($P<0.05$). The circumference and mean cross-sectional area of the paired corpus cavernosum were effectively preserved in the sildenafil + ICA. In addition, the numbers of neuronal NO synthase (nNOS)-positive nerves and EdU-positive cells coexpressing S100 in the ICA-treated groups were greater compared with the control group ($P<0.05$).

Conclusions: These results indicate that ICA promotes endogenous SCs to differentiate into Schwann cells, which is essential for the regeneration of nNOS-positive nerves after BCNI; on this basis, sildenafil can then improve penile engorgement and prevent penile atrophy through the NO-derived smooth muscle relaxation. Therefore, the combined use of ICA and daily sildenafil may be a candidate for the prevention and cure of neurogenic ED in the future.

Keywords: Icariin; erectile dysfunction (ED); bilateral cavernous nerves injury (BCNI)

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