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Effects of hormone replacement therapy in postmenopausal rats with circadian rhythm disorder and burn injury-induced kidney damage

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This study investigated the effects of burn injury and circadian rhythm disorder on the kidneys of postmenopausal rats and potential protective role of hormone replacement therapy (HRT). Forty-eight female Sprague Dawley rats (20-22 weeks old) were divided into six groups: control, circadian rhythm disorder (PC), burn injury (B), circadian rhythm disorder with burn injury (PCB), circadian rhythm disorder with burn injury treated with estradiol-drospirenone (PCBE), and burn injury treated with estradiol-drospirenone (PBE). Estradiol-drospirenone combination for HRT administration (0.01 mg/kg 17 β -estradiol and 0.02 mg/kg drospirenone) for 14 days. The study lasted 15 days, after which histopathological and immunohistochemical analyses were conducted on kidney tissues. Serum cortisol, creatinine, and blood urea nitrogen (BUN) levels significantly increased in the B, PC, and PCB groups compared to the control ($P < 0.001$). However, these parameters significantly decreased in the PBE and PCBE groups ($P < 0.001$). Histopathological damage and cyclooxygenase-2 (Cox-2), hypoxia inducible factor-2 (Hif-2), and interferon-gamma (IFN- δ) expression were significantly elevated in the B, PC, and PCB groups ($P < 0.001$), whereas estradiol-drospirenone treatment markedly reduced these pathological alterations ($P < 0.001$). These findings suggest that the estradiol-drospirenone combination may have a therapeutic role in mitigating kidney damage caused by circadian rhythm disorders and burn injuries in postmenopausal individuals.

Keywords: Burn injury, Circadian rhythm, Cyclooxygenase-2 (Cox-2), Estradiol-drospirenone, Hypoxia inducible factor-2 (Hif-2), Interferon-gamma (IFN- γ)