



Physiological Effect of Glycyrrhizic Acid on Adrenal Insufficiency Induces by Glucocorticoid in Rats

WAFAA AL. BNYEAN^{1,2}, ZAINAB A.H. AL-MOUSAWI^{1*}

¹Department of Physiology, Pharmacology and Biochemistry, College of Veterinary Medicine, University of Basrah, Iraq; ²Institute of Medical Technology of Baghdad, Middle Technical University, Iraq.

Abstract | This study investigates the efficacy of Glycyrrhizic acid (GA) against adrenal insufficiency caused by glucocorticoids in female rats. Fifty female rats were divided randomly into five groups. Negative control group(G1): Normal saline was given orally to rats. Positive control group(G2): rats for seven days were treated with Hydrocortisone Sodium I.P. (50 mg/kg). Therapeutic group(G3): rats for seven days were treated with Hydrocortisone Sodium I.P. (50 mg/kg) and then 14 days with GA (100 mg /kg) orally. Protective group(G4): Rats were treated for seven days with hydrocortisone Sodium I.P. (50 mg /kg) with GA for 14 days(100mg/kg) orally. glycyrrhizic acid Group (G 5): rats for 21 days, were given 100 mg/kg of GA orally. At the end of the experiment, Serum cortisol, ACTH, CRH hormone, 11 β -Hydroxysteroid Dehydrogenase enzyme (11 β -HSD), and malondialdehyde were measured. The results revealed treatment with glycyrrhizic acid improved significantly ($P < 0.05$) in serum cortisol, ACTH, CRH hormones, and (11 β -HSD) enzyme concentration, while was a significant reduction in serum MDA level in the therapeutic and protective group compared with the positive control group. Our results concluded that glycyrrhizic acid improves the alteration caused by hydrocortisone of hypothalamus pituitary adrenal axis hormones and reduces the free radicals.

Keywords | Adrenal insufficiency, Glycyrrhizic acid, 11 β -HSD, Hydrocortisone, Rats

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***Correspondence** | Zainab A.H. Al-Mousawi, Department of Physiology, Pharmacology and Biochemistry, College of Veterinary Medicine, University of Basrah, Iraq; **Email:** Zainab.hassan@uobasrah.edu.iq.

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INTRODUCTION

Adrenal insufficiency (AI) is a clinical disorder that results in an inability of the adrenal cortex to produce or secrete cortisol. Adrenal insufficiency may primary (PAI) arise from secondary pathology of the adrenal gland which causes a defect at the adrenal level, secondary adrenal insufficiency (SAI) due to pathology of the hypothalamic or pituitary gland results in a defect at the pituitary level, or tertiary adrenal insufficiency (TAI) due to defect at the hypothalamic level as a result of inhibition of the hypothalamus pituitary adrenal axis via the therapy of exogenous glucocorticoids. PAI is also characterized by mineralocorticoid (aldosterone).

deficiency (Kumar & Wassif, 2022; Martin-Grace et al., 2020). Synthetic glucocorticoids (GCs) due to their ability to reduce inflammation and inhibit the immune system, GCs are frequently employed, the potential glucocorticoid therapy side effect is inhibition of the hypothalamus pituitary adrenal axis resulting in adrenal insufficiency. Various factors are increasing the incidences of adrenal insufficiency caused by glucocorticoids such as the glucocorticoid dose, route of administration, the duration of glucocorticoid therapy, dosage and potency of glucocorticoid, synchronized medicines that interfere with glucocorticoid metabolism, and individual sensitivity. When the treatment of the exogenous glucocorticoid medication is lowered, pa-