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Influence of Hydrocortisone on Blood Profile, Total Protein, And Glucose in Female Rabbits

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ABTRACT

The purpose of this study is to examine how hydrocortisone affects a few blood parameters in female rabbits. Ten local rabbits were split into two equal and random groups. As a control, the first group was employed. The second group received daily intramuscular injections of hydrocortisone at a dose of 0.1 mg/kg B.W. Blood serum was collected every day from the first day and evaluated for total cholesterol, HDL (high-density lipoprotein), LDL (low-density lipoprotein), TG (triglycerides), and total protein after five weeks. The findings demonstrated that hydrocortisone reduced total protein and cholesterol while increasing HDL, TG, LDL, and glucose; body weight had no effect.

Keywords: Blood Profil, Hydrocortisone, Female Rabbits, Glucose, Total Protein

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INTRODUCTION

When given as a medication, the hormone cortisol is known as hydrocortisone Becker (2001). Cortisone lowers immunity and speeds up blood sugar through gluconeogenesis Lightman et al., (2020); Hoehn and Marieb (2010). According to a study, catecholamines and cortisol cooperate to encourage the conversion of muscle glycogen to glucose for utilization by the muscle tissue Sluiter et al, (2000). Given that patients with increased amounts of circulating glucocorticoids (cortisol) exhibit lipogenesis, the effect of cortisol on lipid metabolism is evident Laycock and Meeran (2013). Even though lipolysis is encouraged by an abrupt rise in circulating cortisol Djurhuus et al., (2002). Burning and stinging sensations are the most frequent side effects following topical hydrocortisone treatment Cho (2023). Long-term use can cause problems with the adrenal glands, high blood sugar, and vision loss Crown (2019).

METHODS

Twenty 500–700-gram female rabbits from nearby markets were split equally and at random into four groups. The second group received daily intramuscular injections of HCG (30 IU/kg B.W.), whereas the first group served as a control. The third group received daily injections of 0.1 mg/kg B.W. i/m hydrocortisone (Alvertran Werfft AG-Viena company) (MC-Chypre company). Until the end of treatment, the animals were weighed daily. They were sedated by inhaling diethyl ether after five weeks, promptly dissected, and had blood extracted from the abdominal vein known as the vena cava. After that, the blood was centrifuged at 1000 g for 15 minutes. After the blood was separated, an auto analyzer and Randox kits (SLIM 260-Ascreen Master) manufactured by SEAC were used to automatically measure the concentrations of total cholesterol, HDL, LDL, TG, total protein, and glucose. Using pH strips, the blood serum's pH was determined. The data were displayed as means + S.D. and percentage differences.

RESULTS AND DISCUSSION

While not affecting body weight, hydrocortisone raised LDL (58.35%), TG (12.35%), and glucose (26.34%) levels Table 1 while lowering cholesterol (14.98%) and overall protein (-12.3%). Table 2 Djurhuus et al., (2002) Noted that lipolysis is encouraged by an abrupt rise in the amount of cortisol in the blood.

According to a study on heart transplantation, glucocorticoids lower hepatic lipase and CETP following surgery, which raises HDL cholesterol Atger et al., (1993). After methylprednisolone was administered to rats, the increased LDL Hazra et al., (2008). LDL cholesterol and endogenous plasma have favorable connections, according to research on the effects of glucocorticoid hormones on lipoprotein metabolism, acute and chronic dosage, and replacement of hypercortisolism in healthy males between the ages of 52 and 67 Staels et al., (1991). An experimental study on rabbits showed that a single dose administered raised TG but not total cholesterol Scherbakova et al., (1975). A human study showed that patients who received hydrocortisone had raised Body mass index, systolic and diastolic blood pressure, high-density lipoprotein and triglyceride levels, and body mass index did not differ significantly Quinkler et al., (2017).

By reducing muscle and adipose tissue's absorption of glucose, accelerating the breakdown of lipids into fatty acids (lipolysis), and slowing protein synthesis, it also raises blood glucose levels Becker (2001). Adrenaline and glucagon are two hormones that enhance the production of glucose, while cortisol influences their effects Laycock and Meeran (2013) and stimulates insulin release. Elevated cortisol levels, if long-term, can result in muscular atrophy and proteolysis, or the breakdown of proteins. These results confirm our findings in Table 2 Loisa et al., (2007). Emphasized that hydrocortisone causes hyperglycemia and would lessen blood glucose swings. According to Loisa et al. (2009), the frequency of hyperglycemic episodes was decreased with continuous hydrocortisone infusion Loisa et al., (2007). Patel et al., (2018) After receiving a cortisone injection, diabetics' blood glucose levels were greater than usual.

TABLE 1. The effects of hydrocortisone on cholesterol, LDL, HDL, and TG. n=5

Mg/dl	Control	Hydrocortisone	
	Mean ± SD	Mean ±SD	Difference percentage
Cholesterol	93.4 ± 17.08	79.33 ± 33.068	-14.98
LDL	20 ± 15.03	31 .67 ± 17.793	58.35
HDL	31 ± 6.18	24. ± 12.96	-22.58
Triglyceride	100 ± 20.12	121.33 ± 17.931	12.3

%Percentage difference of control = Difference standard deviation =SD

TABLE 2. The effects of hydrocortisone on total protein, glucose, and body weight

Mg/dl	Control Mean ± SD	Hydrocortisone Mean ± SD	Difference percentage
total protein	7.3 ± 1.04	6.4 ± 1.104	-13.3
Glucose	83.9 ± 0.471	10.6.66 ± 9.977	26.34
Body weight	663.333 ± 181.637	526.136 ± 205.462+	22.45

%Percentage difference of control = Difference standard deviation =SD

CONCLUSION

Our findings revealed that hydrocortisone administration in rabbits reduced levels of total protein and cholesterol and increased levels of HDL, TG, LDL, and glucose, while there were no significant alterations in body weight.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.