Effect of intraperitoneal administration of ghrelin on some of serum biochemical indices in geese

Habib Aghdam Shahryar, Alireza Lotfi, Saeid Chekani_Azar
Department of Animal Science, Shabstar Branch, Islamic Azad University- Shabstar, Iran

Abstract

The aim of present study was to investigation on the effect of exogenous ghrelin on some of serum biochemical indices in geese. Sixty 28d -old geese were assigned in to 3 treatments and 4 replicates in each treatment to study in 40d experimental rearing period. Treatment 1 (G0): intact or without any injection, treatment 2 (G50): injected with 50 *n*g ghrelin/kg BW, and treatment 3 (G100): injected with 100 *n*g ghrelin/kg BW. Intraperitoneal (IP)-injection of ghrelin was conducted on d 28 of age and before onset of experimental rearing period. Blood samples were taken 12 hours after injection. Ghrelin administration didn't have considerable effects on total cholesterol, triglyceride, Ca and P. However, uric acid wad elevated due to administration of ghrelin in initial period of experiment. But at end of rearing period (d 68), total cholesterol, uric acid and P have considerable elevation for group subjected to 100ng ghrelin administration (table2). Another biochemical indices of serum includes glucose, triglyceride and Ca have not any changes in 68 d old goose. As conclusion, exogenous ghrelin in geese didn't affect serum glucose and Ca. but it cause moderate elevation of P level and sever elevation in uric acid (may because of protein consumption as energy source) and total cholesterol. These results about serum lipids and Ca are different with ghrelin effects in chickens.
Key words: Ghrelin peptide, Grow hormone-releasing, Serum biochemical, Geese

1. Introduction

Published literatures have demonstrate major regulatory functions for ghrelin, such as growth hormone-releasing activity [1], food intake, weight gain and energy balance [2, 3]. Ghrelin is a strength corticosterone-releasing peptide, and the effect is clearer than the GH-releasing activity [4]. In chicken, ghrelin was isolated by Kaiya et al., [5] that it has 26 amino acids and is shorter than human or rat ghrelin. Ghrelin has been identified in six species of birds includes chicken, turkey, emu, goose, duck and Japanese quail [6]. Avian ghrelin has numerous similar activities with mammalian ghrelin. In this regards, GH-Releasing, glucose-Regulating, and regulation of food intake are documented as major functions of ghrelin in general term [4]. But its biological effects remain unknown in goose, duck, emu, and turkey.
In present study, the effect of exogenous peripheral ghrelin on some biochemical indices (glucose, total cholesterol, triglyceride, Ca, P and Uric acid) in serum of growing geese was investigated.

2. Materials and Method

This experiment was conducted in poultry research station of Iranian agricultural research center in Eastern Azerbaijan province, Iran, in 2012. Sixty 28d old geese were assigned in to 3

*Corresponding author: Address: Department of Animal Science, Shabstar Branch, Islamic Azad University-Shabstar, Iran. E-mail address: h_a_shahriar@yahoo.com, Phone: +989144023126.

treatments and 4 replicates (include 5 birds) in each treatment. The experiment was arranged in completely randomized design (CRD).

Injection procedure

The lyophilized rat ghrelin was purchased from Sigma-Aldrich Co. (USA), dissolved in 1% acetic acid solvent and desired concentrations of ghrelin were prepared. 22G needles were used for *ip*-injection. Each sterilized needle was used for individual injection. The injected dosage of ghrelin was different in treatments: treatment 1 (G0): intact or without any injection, treatment 2 (G50): injected with 50 ng ghrelin/kg BW, and treatment 3 (G100): injected with 100 ng ghrelin/kg BW. Injection procedure was conducted on d 28 of age and before onset of experimental rearing period.

Blood samples and analyses

The blood samples obtained from 28- and 68 d-old birds were centrifuged (1,200 X g, 7 min, 18°C), and serum was prepared for determination of some blood biochemical parameters with Alcyon 300 auto analyzer (Abbott Park, IL., USA) and its commercial kits (Elisa Pars Azmoon kits, Pars Azmoon Inc.) for these measures.

Experimental procedure was in according to recommendations of Islamic Azad University-Veterinary department Animal ethics committee.

3. Results

The biochemical parameters of analyzed serum are presented in tables 1 and 2.

According to table1, ghrelin administration didn't have considerable effects on triglyceride (TG), Calcium (Ca) and phosphorus (P). However, uric acid was elevated due to administration of ghrelin in initial period of experiment. But at end of rearing period (d 68), uric acid, total cholesterol (TC), and P have considerable elevation for group subjected to 100 ng ghrelin administration (Table 2). Another biochemical indices of serum includes glucose, triglyceride and Ca have not any changes in 68 d old goose.

Table 1. Effect of IP-injection of exogenous ghrelin on serum biochemical characterizes in 28 d old goose

Treatment	Injection dosage (ng/kg BW)	Glucose (mg/dL)	Total cholesterol (mg/dL)	Triglyceride (mg/dL)	Ca (mg/dL)	P (mg/dL)	Uric acid (g/dL)
Intact (control)	0	204.50	162.75	193.25	10.32	5.62	1.40 [b]
G50	50	192.00	152.50	280.75	10.45	6.17	2.87 [a]
G100	100	182.25	168.00	221.25	9.92	7.05	3.52 [a]
P-value		0.1380	0.5746	0.3654	0.9331	0.2976	0.0244
SEM		8.16	11.85	48.58	0.45	0.20	0.52

-different letters (a and b) show significant difference, $p<0.05$.

Table 2. Effect of IP-injection of exogenous ghrelin on serum biochemical characterizes in 68 d old goose

Treatment	Injection dosage (ng/kg BW)	Glucose (mg/dL)	Total cholesterol (mg/dL)	Triglyceride (mg/dL)	Ca (mg/dL)	P (mg/dL)	Uric acid (g/dL)
Intact (control)	0	210.00	247.25 [b]	63.50	11.20	5.70 [b]	3.67[b]
G50	50	210.75	231.00 [b]	47.50	8.20	5.05 [b]	1.98 [c]
G100	100	225.00	308.75 [a]	45.00	10.20	7.50[a]	4.72[a]
P-value		0.5830	0.0099	0.1523	0.1415	0.0238	0.001
SEM		2.89	16.68	7.58	1.02	0.60	0.30

different letters (a and b) show significant difference, $p<0.05$

4. Discussion

It has been shown rat ghrelin, regardless to elevation of serum glucose concentration, had negative effect on insulin secretion from the pancreas [7]. Akamizu et al. [8] had reported that ghrelin causes decreasing insulin release and subsequent glucose elevation in human. In present study in contrast to human ghrelin, the administrated rat ghrelin didn't cause any changes in glycemic status of goose at onset of experiment or end of rearing period (table 1 and 2). In neonatal chicken, Buyse et al. [9] stated that ghrelin has anti-lipogenic effect. In contrast to their findings [9] ghrelin didn't have any effect on geese serum triglyceride. Increase in P level (table 2) may be because of ghrelin role in ontogenesis [10] that more serum P can be support this process. Increases in uric acid in present study (table 1 and 2) are in agreement with Khazali [11] that in their study, central injection of ghrelin cause significant elevation in serum urea levels in goats under normal and limited regimen. Also, the elevated TC level may be because of positive correlation of ghrelin with LDL-cholesterol [12] that in present study it can be visible at end of rearing period. It seems that these elevations in uric acid may be because of consumption of proteins as an energy source, and the plasma acid uric level is considered as a product of protein catabolism [11]. In present study the glucose serum was constant after ghrelin administration. May ghrelin causes a metabolic shift to more protein consumption instead of glucose. As conclusion, exogenous ghrelin in geese didn't affect serum triglyceride, glucose and Ca. but it cause moderate elevation of P level and sever elevation in uric acid and total cholesterol (TC). These results about serum lipids and Ca are somewhat different with ghrelin effects in chickens.

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