

ORIGINAL ARTICLE

Effect of Nicotine and Camellia Sinensis on the Length of Chick

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ABSTRACT

Objective: To study the oxidative stress of nicotine on the growth of chick, and to observe the role of antioxidant such as camellia sinensis in reducing the harmful effects of nicotine.

Study Design: Randomized controlled trial.

Place and Duration of Study: The study was conducted at Army medical college in Anatomy department from 2nd November 2011 to 2nd November 2012 in collaboration with poultry research institute Rawalpindi (PRI).

Materials and Methods: Fertilized eggs of Fayoumi species were selected at zero hour of incubation. Four groups were made, each group comprising of ten eggs. Control group (G1) was given normal saline, experimental group (G2) was given green tea extract, experimental group (G3) was given 0.0001% nicotine solution, and experimental group (G4) was given both 0.0001% nicotine solution and green tea extract. First exposure was at 48 hours of incubation and second at 48 hours of hatching. Chick length was measured after one month of hatching, with the help of inch tape from vertex till the third toe tip.

Results: It was observed that nicotine treated group such as (G3) and (G4) were weak as compared to the (G1), the length of chick which was measured at one month of age was less in comparison to (G2) and (G1). In case of (G4), having administration of both the solution that is nicotine and green tea extract, showed better growth in comparison to nicotine treated group (G3), but its growth was less in comparison with control group (G1) and experimental group (G2).

Conclusion: Green tea extract helps to undo the toxic effects of nicotine but cannot overcome the reverse effect of nicotine toxicity.

Key Words: Chick, Nicotine, Camellia Sinensis, length.

Introduction

Bone health problem increasing around the world.¹ Bone mineral density are affected by the different health issues like osteoporosis.² In this study nicotine which is considered to be one of the main constituent of cigarette smoke, showed its affects on the developing skeleton of chick. As not much work done to see the teratogenic affects by active or passive smoking. In present study nicotine affect on developing bone by reducing the cell proliferating activity of the osteoblasts, supporting the evidence that it has a direct effect on bone cells as nicotine and tobacco extract stimulates glycolysis and inhibits bone synthesis and mitochondrial activity.³ Camellia sinensis extracts was obtained from its dried leaves of green tea. Dried leaves of green tea had to undergone the process of minimal

oxidation by the process of soaking in warm water. Green tea catechins which are the main constituents of the camellia sinensis extracts have been found to have many unique anti microbiological activities. The anti microbiological activities includes such as antibacterial, antifungal, antiviral and antitoxic effects.⁴ These effects helped to detoxify the toxic effects by the presence of free radicals after the exposure of nicotine to the developing embryo in the present study.

Materials and Methods

The study was randomized controlled trial. In this study which was carried out at Anatomy department of Army Medical College Rawalpindi from 2nd November 2011 to 2nd November 2012 in collaboration with the Poultry Research Institute (PRI) Rawalpindi all the procedures were approved by Ethical Review Committee of Army Medical College Rawalpindi. Duration of the study was two month. Fertilized eggs with normal shape (oval), colour (off white), and size (medium) were included in the study. Whereas different colour of eggs, shape and size was excluded from the study. Ten number of eggs in each group were selected total forty eggs were used. Fertilized Fayoumi species eggs of chick

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were selected at zero hour of incubation. Incubation of eggs was done after properly fumigating and clearing the hatchery. Temperature was maintained at 37.50C, the relative humidity was kept between 75% and proper ventilation was maintained. Rotations of eggs were done 4 hourly. Placement of eggs in hatchery was taken as day zero. Four groups were made each group was comprising of ten numbers of eggs. Control group(G1)was given normal saline in 0.1ml of quantity. Experimental group (G2) was given green tea extract in 0.1ml of quantity, experimental group (G3) was given 0.0001% nicotine solution in 0.1ml of quantity,⁵ experimental group (G4) was given both 0.0001% nicotine solution and green tea extract in 0.1ml quantity. All the working solutions were given through the blunt end of the egg with the help of insulin gauge needle. Double exposure of doses was given. First exposure was at 48 hours of incubation and second at 48 hours of hatching (post natal dose). At the age of one month, chicks length was measured with the help of inch tape from vertex till tip of the third toe⁶ (Fig1). Data was entered in a database using SPSS (Statistical Package for Social Science) version 16. Data was presented as tables. Chi-square test was used for the comparison between the groups. p value < 0.05 was considered significant.

Results

For results and observations the gross features of one-month-old chick were taken into account. Length of chicks of (G1) and experimental group (G2) both showed mean value 37.833±0.117cm. The mean values of (G3) and (G4) were 20.000 ±0.00 cm and 26.000±0.000cm respectively (Table I).

Table I: Mean values of Length of one month old Chick (cm)

Number of groups	Total number of chicks in each group(N)	Mean value of chick length
G1	10	37.8333 ± 0.11785
G2	10	37.8333 ± 0.11785
G3	10	20.0000 ± 0.00000
G4	10	26.0000 ± 0.00000

Control group (G1) in comparison with experimental group (G2) showed insignificant result with p value (1.000). Whereas p values of control group (G1) in comparison with experimental group (G3) and (G4) were (0.000). Experimental groups when compared with each other such as, (G2) in comparison with

(G3) and (G4) both showed significant results with p values (0.000). Comparison of (G3) and (G4) with each other showed statistically significant Result with p value (0.000) (Table II).

Table II: Comparison of length of one month old chicks with each other

Dependable Variable	Comparison Between Groups		P value
	Group	Group	
LENGTH OF CHICK	G1	G2	1.000
		G3	0.000*
		G4	0.000*
	G2	G1	1.000
		G3	0.000*
		G4	0.000*
	G3	G1	0.000*
		G2	0.000*
		G4	0.000*
	G4	G1	0.000*
		G2	0.000*
		G3	0.000*

*P value < 0.05 statistically significant.

Discussion

In this study wok nicotine shows its toxicity by

between dopamine and Prolactin.¹² Nicotine a major component of tobacco smoke shows its adverse effect during pregnancy as it does not only reduces fetal body weight but also impairs development of fetus by involving the indirect regulation of utero-placental circulation.¹² Excessive bone resorption can cause deterioration in trabecular bone structure in nicotine group which may be due to excessive osteoclastogenesis and inadequate osteoblastogenesis in male rats.³ Nicotine and its metabolites are proven for causing number of medical problems during developing stages of various experimental animals. As it was observed on Swiss albino rats, which were treated with nicotine, the functioning of gonads was abnormal affecting spermatocyte count. Green tea treatment given to same Swiss albino rats helped to restore the number of spermatocyte and spermatids to nearly normal level. By this it was proved that green tea antioxidant property helped to suppress the toxicity of nicotine.¹³ Nicotine is considered to be responsible for the osteoporosis as work was done on male rats decreasing the bone strength.¹⁴ Smoking decreases body mass, as it provide an osteogenic stimulus which is linked to higher loss of mineral density of bones.¹⁵ Bony fractures which occur due to any reason results in causing back pain, height loss and physical disability.¹⁶ The present work was designed to study the gross changes in the developing chick exposed to nicotine one of the main constituent of tobacco smoke and to observe the preventive effects of antioxidant such as green tea. The current study revealed that green tea significantly prevented some of the harmful effects of nicotine on developing chick.

Conclusion

To conclude that nicotine, one of the constituent of cigarette smoke causes toxic effects on the developing chick and administration of green tea extract neutralizes some of the harmful effects of tobacco smoke showing its antioxidant properties.

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Fig 1: Photograph showing measurement of chick length with the help of inch tape by placing it between the vertex and the third toe

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