

Gonadosomatic Index of Swiss albino male mice treated with Amphotericin B

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ABSTRACT

This work investigates the Gonadosomatic index(GSI) by weight and by volume. The actual weights of the testes of 35 sexually mature mice were used to evaluate the gonadosomatic index. The result obtained showed that the GI by weight and by volume is highly significant an ($p < 0.024$ and $p < 0.001$) respectively.

INTRODUCTION

Now a day's most of the world's population is access to the medical treatments and synthetic drugs, out of those one of it is Amphotericin B which is a polyene macrolide which has been used clinically for more than 30 years, and it has remained the agent of choice for treating severe disseminated, fungal infections (Graybill & Craven, 1983) and has various serious side effects including fever, chills, nausea, hypokalaemia and nephrotoxicity but its effect on male reproductive system is not known, so the present work is designed to know the effect of this drug in male reproductive system. Gonadosomatic index (GSI) is a tool for measuring the sexual maturity of animals in correlation to the development of testes and ovary. GSI is helpful in identifying the development and growth of gonads simultaneously takes place in an organism.

According to Wingfield and Grimm(1977):

$$\text{GSI} = \frac{\text{Weight of gonads} \times 100}{\text{Weight of body}}$$

Gonadosomatic index which is either the testicular volume per body weight or testicular weight per body weight is species specific and varies with age and breeding season even within the same species. Since, the rate of spermatogenesis is determined by gonadal mass, male tends to grow relatively large testicles in species where the ejaculation of different males co-occurs and complete for the fertilization of a set of ova in the female reproductive tract at the time of ovulation. According to Pizzari (2006), rodents particularly murids are an appropriate eutherian for the study of sperm competition because the high inter specific variation in male Gonadosomatic index value indicates different level of sperm competition across, species. Such observation is also observed in lemurs (Glandrs *et.al.* 1992, Pochron *et. al* 2002).

MATERIALS AND METHODS

A total of thirty five (35) adult male Swiss albino mice were used in the study. The age between 12 weeks to 22 weeks weighed between 20 gm to 36 gm. All the animals were caged on a well ventilated room maintained at temperature 18° C to 24° C, with 12 h photoperiod and feed on pelleted food and water ad libitum. All the animals were arranged in different groups.

GROUPS	TREATMENT
G- I	Untreated Control
G- II	Vehicle treated initial control (VTIC)
G- III	24 h after drug treatment
G- IV	2 week after drug treatment
G- V	4 week after drug treatment
G- VI	6 Week after drug treatment
G- VII	Vehicle treated terminal control (VTTC)

Body weight in gms
Initial Body weight (IBW); Final body weight (FBW)

	G-I		G-II		G-III		G-IV		G-V		G-VI		G-VII	
MIC E	IB W	FB W	IB W	FB W	IB W	FB W	IB W	FB W	IB W	FB W	IB W	FB W	IB W	FB W
1	30	32	30	30	32	34	30	32	30	32	30	36	30	33
2	30	32	30	32	32	35	30	32	30	32	30	34	30	33
3	32	34	30	33	32	34	30	33	30	32	30	32	32	36
4	32	34	30	34	32	34	30	33	30	32	30	32	32	35
5	32	35	32	35	32	35	30	33	30	35	32	36	28	32
AVG	31.2	33.4	30.4	32.8	32	34.4	30	32.6	30	32.6	30.4	34	30.4	33.8

GONADO SOMATIC INDEX (GSI)

	G-I	G-II	G-III	G-IV	G-V	G-VI	G-VII
MICE	GSI						
1	0.331	0.440	0.205	0.328	0.355	0.213	0.425
2	0.306	0.338	0.254	0.251	0.400	0.314	0.306
3	0.285	0.277	0.268	0.276	0.427	0.342	0.218
4	0.415	0.335	0.278	0.283	0.307	0.441	0.329
5	0.313	0.350	0.244	0.285	0.383	0.369	0.302
AVERAGE	0.330	0.348	0.249	0.276	0.375	0.344	0.316

Testes Size in mm
A/C Setchell and Waites 1964
Testes Volume = $\frac{4}{3} \times \pi \times L/2 \times W/2 \times T/2$

	G-I	G-II	G-III	G-IV	G-V	G-VI	G-VII
MICE	GSI	GSI	GSI	GSI	GSI	GSI	GSI
1	0.043	0.041	0.029	0.022	0.036	0.029	0.031
2	0.037	0.035	0.026	0.021	0.0359	0.024	0.0306
3	0.037	0.033	0.022	0.026	0.036	0.021	0.024
4	0.0398	0.043	0.027	0.026	0.028	0.034	0.0396
5	0.0378	0.028	0.0274	0.029	0.034	0.041	0.021
AVERAGE	0.0389	0.036	0.026	0.0248	0.034	0.029	0.029

TESTES WEIGHT

	G-I	G-II	G-III	G-IV	G-V	G-VI	G-VII
MICE	GSI	GSI	GSI	GSI	GSI	GSI	GSI
1	0.10036	0.0101	0.0656	0.0175	0.1094	0.0081	0.089
2	0.08774	0.0077	0.0057	0.0755	0.1249	0.011	0.086
3	0.08406	0.0071	0.0062	0.07889	0.1816	0.0912	0.073
4	0.11094	0.0123	0.0892	0.0945	0.0928	0.0833	0.1
5	0.12619	0.0159	0.088	0.0966	0.01	0.1054	0.049
AVERAGE	0.101858	0.01062	0.05094	0.072598	0.10374	0.0598	0.0794

Sample collection

Each animal was weighed alive and sacrificed after anaesthesia with chloroform. The testes was collected and weighed (using K - Roy mono-pan analytical balance) free from fat and derbies. The Gonadosomatic index by weight was calculated by dividing the average weight of right and left testicles by the body weight (gm). The data were analysed with the ANOVA analysis using SPSS 16.0.

RESULTS

BODY WEIGHT:

The body weight during the course of study does not show such significant changes as the value obtain from SPSS.16 is 0.177.

TESTES WEIGHT:

Testes weight shows a significant change. It shows a changes in the testes of mice treated with Amphotericin B 24 h after treatment followed by 2 week, 4 week, 6 week, VTTC, VTIC, UTC respectively. The value obtain from SPSS.16 is 0.027.

GSI:

Changes in the gonadosomatic index (weight of the testes/whole body weight) are shown in figure 2. The gonadosomatic index shows a significant decrease after 24 h and 2 week after treatment of drug for 30

days but gradual increase in value in comparison to 4 week, 6 week, untreated and glucose treated respectively. The value obtain from SPSS.16 is 0.024.

TESTES VOLUME:

The testes volume shows a significant change. It shows the changes in the volume of mice treated with Amphotericin B 24 h after treatment followed 2 week, 4 week, 6 Week, VTTC, VTIC and UTC respectively. The value obtained from SPSS.16 is 0.001.

Body weight analysis

Tests of Between-Subjects Effects

Dependent Variable:value

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	Hypothesis	39312.257	1	39312.257	3.127E4	.000
	Error	5.029	4	1.257 ^a		
Treatment variable	Hypothesis	20.343	6	3.390	1.648	.177
	Error	49.371	24	2.057 ^b		
Treatment * variable	Hypothesis	5.029	4	1.257	.611	.659
	Error	49.371	24	2.057 ^b		
Treatment * variable	Hypothesis	49.371	24	2.057	.	.
	Error	.000	0	. ^c		

- a. MS(variable)
- b. MS(Treatment * variable)
- c. MS(Error)

Testes Weight Analysis

Tests of Between-Subjects Effects

Dependent Variable:Value

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	Hypothesis	.399	1	.399	2.166E3	.000
	Error	.001	4	.000 ^a		
Treatment	Hypothesis	.006	6	.001	2.947	.027
	Error	.008	24	.000 ^b		

Variable	Hypothesis	.001	4	.000	.577	.682
	Error	.008	24	.000 ^b		
Treatment *	Hypothesis	.008	24	.000	.	.
Variable	Error	.000	0	.	.	.

a. MS(Variable)

b. MS(Treatment * Variable)

c. MS(Error)

GSI Analysis

Tests of Between-Subjects Effects

Dependent Variable: Value

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	Hypothesis	3.576	1	3.576	2.145E3	.000
	Error	.007	4	.002 ^a		
Treatment	Hypothesis	.057	6	.009	3.026	.024
	Error	.075	24	.003 ^b		
Variable	Hypothesis	.007	4	.002	.535	.712
	Error	.075	24	.003 ^b		
Treatment *	Hypothesis	.075	24	.003	.	.
Variable	Error	.000	0	.	.	.

a. MS(Variable)

b. MS(Treatment * Variable)

c. MS(Error)

Testes Volume Analysis

Tests of Between-Subjects Effects

Dependent Variable: Value

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	Hypothesis	.034	1	.034	989.807	.000
	Error	.000	4	3.462E-5 ^a		
Treatment	Hypothesis	.001	6	.000	5.223	.001
	Error	.001	24	2.572E-5 ^b		
Variable	Hypothesis	.000	4	3.462E-5	1.346	.282

	Error	.001	24	2.572E-5 ^b		
Treatment *	Hypothesis	.001	24	2.572E-5	.	.
Variable	Error	.000	0	.	^c	

a. MS(Variable)

b. MS(Treatment * Variable)

c. MS(Error)

DISCUSSION

The result of this study shows that the exposure of Amphotericin B decreases the gonadosomatic index(GSI), testes weight, testes Volume and no significant changes in the body weight.

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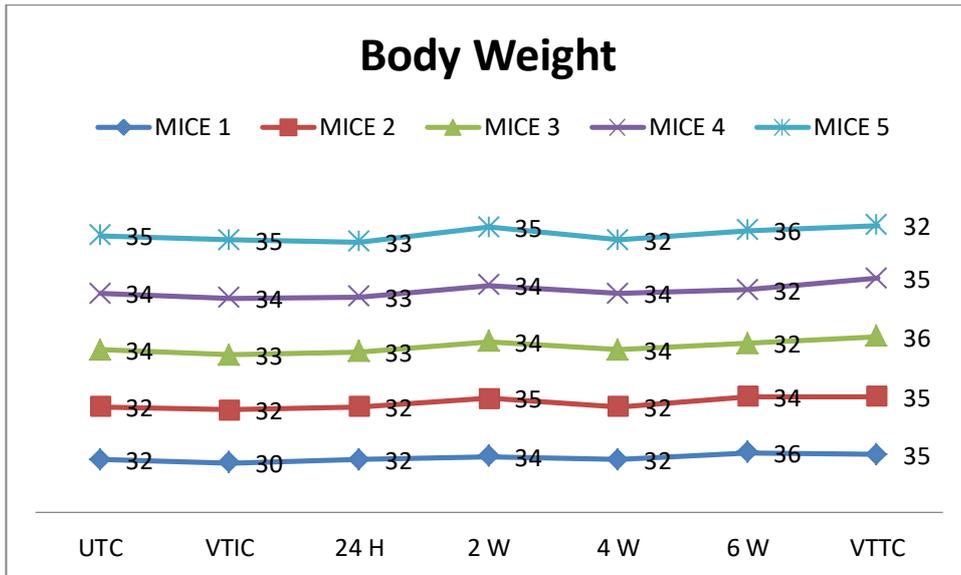


Fig: 1

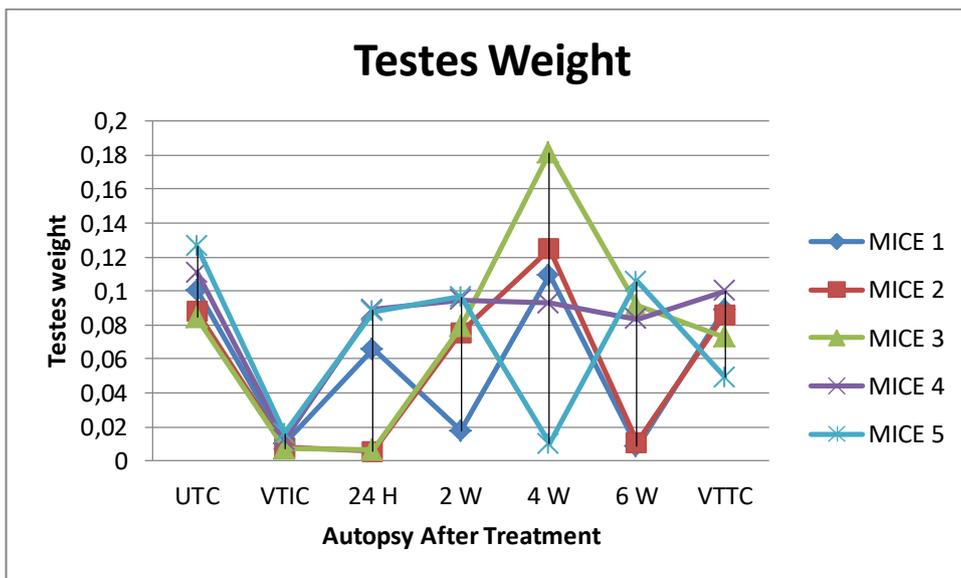


Fig: 2

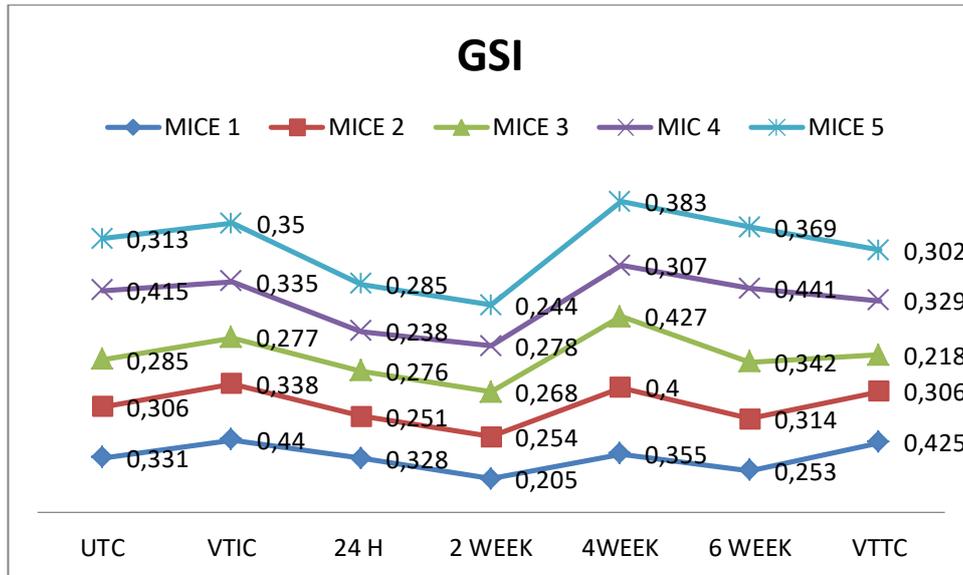


Fig: 3

Testes Volume

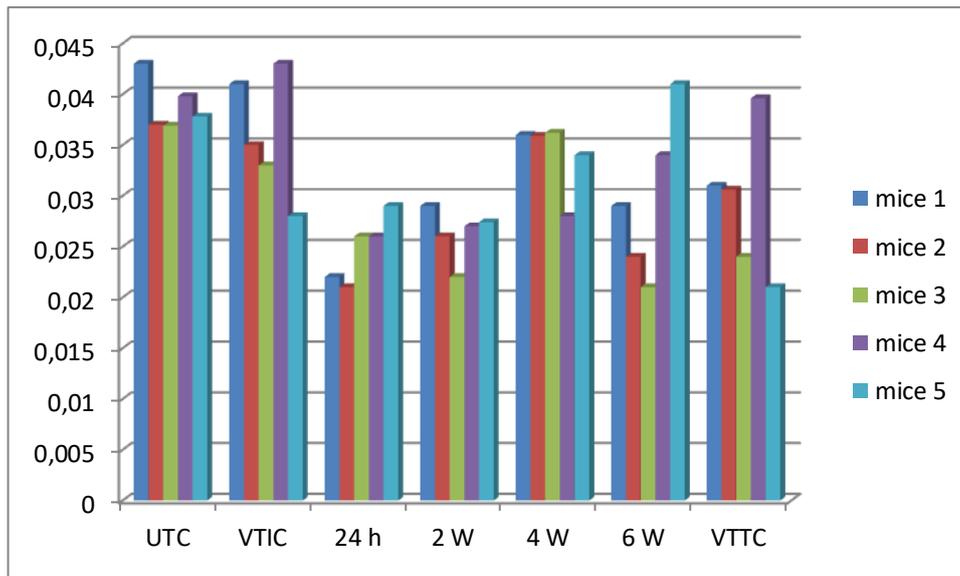


Fig: 4