International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Impact Factor (2012): 3.358

Effect of Shilajit on Testosterone Induced Benign Prostrate Hyperplasia in Rats

Aditya Vikas Sakhare[1], Suraj Ashok Bhagat[2]

Abstract: ***Many plants have shown to improve uncontrolled growth of the prostate gland and improve urinary tract symptoms, which are associated with benign prostatic hyperplasia. Main component of those plants were fatty acids, fulvic acids and dibenzo alpha pyrones and traces minerals also some antioxidants drugs shows protective effect on BPH. Our study to investigate weather shilajit prevents testosterone induced prostatic hyperplasia in rat. Rats were divided into negative control group and testosterone induced prostatic hyperplasia groups (positive control, finasteride treated, low dose of shilajit and high dose of shilajit). All drug and testosterone treatment was given for 14 days. Rats were weighed before and after initiation of an experiment. Prostate weight and body weight ratio (pw/bw) and percentage of inhibition were calculated. Rats were sacrificed under light ether anaesthesia. Both doses of shilajit have significantly inhibited the elevation in prostate weight, doses of shilajit and finasteride showed protective against testosterone induced prostatic hyperplasia in rats.***

Keywords: Shilajit, Testosterone, Prostatic, Hyperplasia

1. Aim and Objectives of Study

1.1 Aim

The purpose of present study is to evaluate the effect of shilajit on testosterone induced prostatic hyperplasia in rats.

1.2 Objectives

a) To investigate the dose dependent effect of shilajit on testosterone induced prostatic hyperplasia in rats.
b) To investigate the dose dependent effect of shilajit on histopathological changes in prostatic hyperplasia in rats.

2. Materials and Methods

Experimental animals: Male wister rats weighing 180-220g were procured from institutional animal facility centre. They were housed individually in clean and transparent polypropylene cages, maintained at room temperature with 12-h light/dark cycle and had free access to food and water. After 7 days of acclimatization they were randomly distributed into experimental groups.

3. Chemicals

1) Shilajit powder (dabur)
2) Finasteride (FINAST. Dr. Reddy's Laboratories)
3) Testosterone propionate (Genesis pharmaceutical Japan)

Experimental animal models and study designs: In order to evaluate fatty acids on testosterone induced prostatic hyperplasia we used following experimental models.
A) Body weight (BW)
B) Prostate weight (PW)
C) Prostate weight (PW) inhibition
D) Prostate weight (PW) to body weight (BW) ratio
E) Percentage inhibition of prostate weight and PW/BW ratio
F) Histopathological investigation

Experimental study phase (I, II, III)
Rats were divided into 7 groups of 6 in each and received the following treatment for 14 days.

Study phase I
- Negative control (NC)----- received vehicle, orally
- Positive control (PC) ------ received testosterone propionate (3 mg kg^{-1}) Subcutaneously.
- Finasteride treatment (FT) ---- received testosterone propionate (3 mg kg^{-1}) subcutaneously.

+ Finasteride (5 mg kg^{-1}) orally.

Study phase II
- Shilajit low dose 180 mg/kg

Study phase III
- Shilajit high dose 360 mg/kg

Summary of experimental animals and experimental design of studies

Strain and gender	Phases	Weights (gm)	Experimental groups and number of animals in each group	Treatment period (days)	Parameters measured
Wister rats male	I	(180-220)	Negative control (n=6) Positive control (n=6) Finasteride treatment (n=6)	14	A) Body weight (BW) B) Prostate weight (PW) C) Prostate weight (PW) inhibition D) Prostate weight (PW) to body weight (BW) ratio E) Percentage inhibition of prostate weight and PW/BW ratio F) Histopathological investigation
Wister rats male	II	(180-220)	Shilajit low dose (180 mg/kg)	14	A) Body weight (BW) B) Prostate weight (PW) C) Prostate weight (PW) inhibition D) Prostate weight (PW) to body weight (BW) ratio E) Percentage inhibition of prostate weight and PW/BW ratio F) Histopathological investigation
Wister rats male	III	(180-220)	Shilajit high dose (360 mg/kg)	14	A) Body weight (BW) B) Prostate weight (PW) C) Prostate weight (PW) inhibition D) Prostate weight (PW) to body weight (BW) ratio E) Percentage inhibition of prostate weight and PW/BW ratio F) Histopathological investigation

4. Results

A) Body weight: There is no significant difference in body weight of animals before intimation and after completion of treatments.

Sr. No	Groups	Body weight (gm)	
		Initial	Final
1	A	198.3±10.53	201.3±5.364
2	B	198.3 ±5.57	200.2±5.991
3	C	201± 4.782	204.7±3.739
4	D	202.8±6.630	205.7±3.756
5	E	198.3±4.667	195.5±4.522

Group A: negative control, Group B: positive control, Group C: finasteride (5mg/kg), Group D: shilajit (180mg/kg), Group E: (360mg/kg). Statistical analysis is done by one-way ANNOVA followed by bonferroni's multiple comparison tests.

B) Prostate weights: In positive control group significant ($p<0.001$) elevation of prostate weight are compared with negative control group. Shilajit 180mg/kg and 360mg/kg significantly reduced the testosterone induced elevation in prostate weight gain by 46.53% and 72.57% respectively. As expected, finasteride (5mg/kg) reduced significantly the testosterone induced prostate enlargement by 79.75%.

Sr.No.	*Groups*	*Prostate weight (gm)*	*% Inhibition*
1	A	0.302 ± 0.011	-
2	B	0.663 ± 0.019	-
3	C	0.375 ± 0.009	79.75%
4	D	0.464 ± 0.012	46.53%
5	E	0.401 ± 0.009	72.57%

Group A: negative control, Group B: positive control, Group C: finasteride (5mg/kg), Group D: shilajit (180mg/kg), Group E: (360mg/kg). Statistical analysis is done by one-way ANNOVA followed by bonferroni's multiple comparison tests.

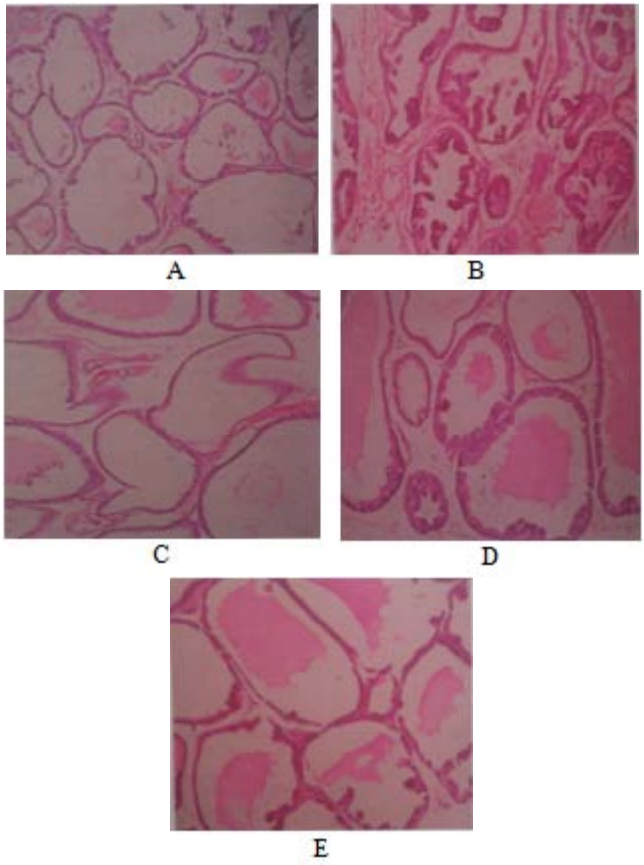
C) Prostate weight to body weight ratio (PW/BW Ratio)
Shilajit in dose of 180mg/kg and 360mg/kg significantly reduced the testosterone induced prostate weight to body weight ratio by 51.17%, 63.61% respectively. Finasteride (5mg/kg) significantly reduced the PW/BW ratio by 76.32%.

Sr. No	*Groups*	*PW/BW ratio*	*%Inhibition*
1	A	1.553± 0.0145	-
2	B	3.048± 0.0815	-
3	C	1.91± 0.0110	76.32%
4	D	2.283 ±0.0625	51.17%
5	E	2.097 ± 0.0056	63.61%

Group A: negative control, Group B: positive control, Group C: finasteride (5mg/kg), Group D: shilajit (180mg/kg), Group E: (360mg/kg). Statistical analysis is done by one-way ANNOVA followed by bonferroni's multiple comparison tests.

D) Histopathological Investigation
There was no change in the histoarchitecture of prostate gland in negative control group. The tissues were tightly packed epithlieum was cuboidal and regular in size (group A). In positive control group, there was disruption in the histoarchitecture of the prostate tissue. The amount of connective tissue was well marked with increase oval acini size.

The above finding indicates marked reduction in histoarchitecture disruption of prostate in Group D and Group E when compared to positive control.



A= Positive control group
B= Negative control group
C= Testosterone + finasteride
D= Testosterone + low dose of shilajit (180mg/kg)
E= Testosterone + high dose of shilajit (360mg/kg)

5. Discussion

Oral dosing of shilajit treatment for 15 days significantly inhibited the development of testosterone induced prostatic hyperplasia, which was evidenced by reduction in elevation in PW and PW/BW ratio and histopathological studies. It was established that 5α-reductase is an enzyme which is abundantly found in the nuclear membrane microsomes of prostratic epithelial cells that is involved in the conversion of testosterone to DHT. An increased production of DHT results in the development of prostatic hyperplasia. 5α-reductase inhibitors reduce tissue DHT concentration without interfering in the sexual function since they block only the formation of DHT.

6. Conclusion

Oral administration of shilajit for 15 days showed dose dependent inhibition of prostate enlargement induced by testosterone in rats. The preventive effect is likely due to 5α-reducatse inhibition action of these Fulvic acid and dibenzo alpha pyrones.

Further experimental studies are required to confirm the present findings before deciding whether they are meaningful enough to be explored in human with BPH.