

Evaluation of Spermatogenic Activity of Panchamrita Parpati in Albino Rats

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ABSTRACT

Most of Rasashastra texts have mentioned Panchamrita parpati having vrushya property expected to contribute positive results in infertility and impotency so an attempt was made in this regard to establish and provide scientific data for reference claimed with spermatogenic activity study. Panchamrita parpati was prepared as per reference of Bhaishjya Ratnavali and subjected for evaluation of its spermatogenic activity in Wister strain albino rats. Three samples of Panchamrita parpati (pp) low dose (4.5mg) GI, Moderate dose (13.5mg) GII, & High dose (18 mg) GIII, & Wister strain albino rats formed the materials for study. Test drug doses were administered with Ghee in three Groups & orally Ghee in control group. Analysis of cholesterol, Protein, Glycogen Histometric studies were followed. All the samples of test drug have shown significant spermatogenic activity but effect of GIII PP (High dose) was significant than GI, GII, GIV. Panchamrita parpati may be used in different condition of male infertility i.e. in total spermatogenic activity and improve motility, cell division production of sex hormones and spermatocytes to spermatozoa. The effect might be due to balya brumhana, rasayana and vrushya properties and chemical components of Panchamrita parpati.

KEYWORDS: Spermatogenic activity, Panchamrita parpati

INTRODUCTION

Rasashastra is the study of metal and minerals in which great importance has been given to Rasa. The four basic parada yogas in Rasashastra are: a) Khalwi Rasayana Kalpa, b) Parapati Rasayana Kalpa, c) Kupipakwa Rasayana Kalpa, d) Pottali Rasayana Kalpa.

Among these Parapati Rasayana Kalpa is one of the pharmaceutical forms of Rasoushadhi. It possesses flake like appearance and can be powdered. Preparation and use of the parpati has been first mentioned by Chakrapani in his commentary Chakradatta during 11th century in the treatment of Grahani. Panchamrita parpati, one of the Rasoushadhi possesses vrushya property as per classical text like Bhaishajya Ratnavali¹, Rasendra sara Sangraha², Rasa Kaamdhenu³ etc explained about the vrushya property of panchamrita parapati.

Reproduction is the unique property and vital process of the living being. Although infertility may not be a public health priority in many countries, it is the

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central issue in the lives of the individuals who suffer from it. It is a source of social and psychological suffering for both men and women and can place great pressures on the relationship within the couple⁴

Drastic changes of lifestyle, diet, environment, work-related stress, etc in modern era, have negatively affected physical and mental health, including increased incidence of infertility and impotency. In 2001 W.H.O Report of a meeting on 'Current Practices and Controversies in Assisted Reproduction', it is mentioned that infertility affects more than 80 million people worldwide.⁴ According to W.H.O, 51.2% couples are infertile because of a male factor.⁵ W.H.O also recommended that infertility should be recognized as a public health issue worldwide, including developing countries.⁶

In India primary and secondary infertility figures as given in W.H.O studies are 3% and 8%. The Ninth-five year plan (1997-2002) document of the Government Of India had included infertility in the

comprehensive reproductive and child health package⁷.

According to Ayurvedic classics, aim of Ayurveda is to promote the positive health and protect the health of healthy individuals and to cure the disease of sick⁸. Aims or pursuits of the life are to achieve four purusharthas namely Dharma, Artha, Kaama, and Moksha⁹. Out of which Kaama is interpreted as desire for sexual enjoyment, which is essentially important for procreation as well as recreation and relaxation. In ancient times it was believed that without having child one cannot attain moksha.

Vajeekarana, one of the eight branches of Ayurvedha has mentioned several drugs having vrushya property, which helps one in having progeny, increase sexual desire, improve quality and quantity of semen and enable to satisfy partner.

Almost all the medical systems have indicated drugs and treatment modalities for infertility and increasing libido. But most of them turn to be not so effective as claimed or not cost effective for middle and lower economic class of society.

Rasaoushadhis are having quick and better effect than herbal medicines with minimum dosage and without unpleasant taste. These medicines can be a better solution for infertility and impotency. Most of the Rasashastra texts have mentioned panchamrita parpati having vrushya property. Hence this project **“Evaluation of spermatogenic activity of Panchamrita parpati in albino rats”** was undertaken to evaluate the spermatogenic activity and to contribute a potent formulation for infertili

Equipments:

Electronic weighing balance
Microscope slides with cover slips
Centrifuge
Microscope with optical meter
Spectrophotometer
Dissection box
Water bath

Glass wares:

Disposable syringes (2 ml)
Pipettes

Chemicals and Reagents:

1) Carboxyl methyl cellulose
3) 10% formaline
5) Ethanol
7) Sodium Hydroxide
9) Hydrochloric acid
11) Albumin
13) CuSO₄
15) Sodium Potassium Tartrate

Weighing machine
Neubauer's counting chamber
Tissue homogenizer
Microtone
pH meter
Whatman Filter paper No:42
26 No. needle

Test tubes
Glass beakers

2) Normal Saline
4) Haematoxylene and Eosin stains
6) Sodium Bicarbonate
8) Chloroform
10) Ether
12) NaCl₂
14) Distilled water
16) Folin-cio-calteu reagent (FCR)

Materials & Method of Phamaceutical study

Preparation of Panchamrita parpat: Ref:

Bhaishajya Ratnavali

Shuddha Parada - 30gm
Shuddha Gandhaka- 60gm
Loha bhasma -15gm
Abhraka bhasma - 7.5gm
Tamrabhasma - 3.75gm

Equipments:. Khalwayantra , Loha darvi , Spatula, Agni, Gomaya, Kadali Patra, Samadala pidhanaka, Sneha, Hot Water.

Method:

The drugs should be taken in a Loha darvi, smeared with ghee and heated. On complete heat melting it was should be poured over banana leaf (smeared with ghee) kept on fresh cow dung.

Another banana leaf smeared with ghee was kept over it and pressed gently with fresh cow dung over banana leaf immediately and given pressure gently.

After Swangasheetha, the parpati was collected from the leaf and washed with hot water, dried parpati was converted into powder & preserved in dried glass bottle.

MATERIALS AND METHODS of EXPERIMENTAL STUDY

Materials:

1. Panchamrita parpati
2. Goghrita
3. Male Albino rats

- | | |
|--------------------------------|----------------------|
| 17) Trichloroacetic acid (TCA) | 18) Phenol |
| 19) Conc. Sulphuric acid | 20) Acetic anhydride |
| 21) Standard cholesterol | 22) Xylene |
| 23) Paraffin wax Met | |

Method:

1. Healthy adult male albino rats (Wister strain) of 90-100 days old, weighing from 175-200 gm were used for the experiments.
2. The animals were maintained under laboratory conditions with controlled environment of temperature, humidity, light and dark cycles.
3. The animals were fed with balance pellet diet as prescribed by CFTRI (central food and technological research institute, Mysore) and water and libitum.
4. 6 animals were taken in each group for experiment and maximum 3 animals per cage were maintained.
5. Animals were selected from animal house of A.V. Samiti's PGCRC Ayurveda Mahavidyalaya Bijapur.

Experimental Protocol:

Sample Size: 24 albino rats were taken for experimental study. 6 albino rats in each group.

Spermatogenic study:**Study Groups:**

Group I: Administration of Panchamrita parpati Minimum dose with ghee.

Group II: Administration of Panchamrita parpati Moderate dose with ghee.

Group III: Administration of Panchamrita parpati higher dose with ghee.

Group IV: Administration of Ghee Control

Experimental Protocol

Study design	Group I	Group II	Group III	Group IV
Sample size	6 rats	6 rats	6 rats	6 rats
Drug	P.P Low dose with ghee	P.P Moderate dose with ghee	P.P High dose with ghee	Ghee
Dose	4.5mg	13.5mg	18mg	0.5ml
Dosage form	Liquid	Liquid	Liquid	Liquid
Route	Oral	Oral	Oral	Oral
Duration of study	30 days	30 days	30 days	30 days
Autopsy	31st day	31st day	31st day	31st day

Observation & result

Effect of drugs on body weight before and after the administration of drug

n=06

Groups	Before administration	After administration	Before v/s After
Group-I	1833.33±4.082	240.833±14.289	t=8.654 p=0.0001 HS
Group-II (PP)	189.166±5.845	251.66±13.292	t=10.542 p=0.0001 HS
Group-III (PP)	187.5±6.892	258.33±9.832	t=14.45 p=0.0001 HS
Group-IV (Control)	177.5± 1.12	238.33±1.05	t=97.056 p=0.0001

Showing the effect of drugs on net increase in bodyweight after administration of drugs

n=06

Group	G I	G II	G III	G IV
Weight gain	52.503±0.71	62.494±0.71	70.83±0.75	60.83±0.54

Values are Mean ± SEM

Table Showing the effect of drugs on biochemical parameters.

n=06

Biochemical Analysis	After Administration of Drugs				G I v/s G IV	G II v/s G IV	G III v/s G IV	G I v/s G II	G I v/s G III	G II v/s G III
	G I	G II	G III	G IV						
Cholestrol (mg/gm)	11.533±0.1633	12.9±0.894	14.783±0.318	9.38±0.204	t=25.133 p=0.0001 HS	t=38.712 p=0.0001 HS	t=34.96 p=0.0001 HS	t=25.733 p=0.0001 HS	t=36.926 p=0.0001 HS	t=38.712 p=0.0001
Glycogen (mg/gm)	2.836±0.0427	3.4±0.1265	3.476±0.0258	2.64±0.08	t=5.294 p=0.0004 HS	t=12.438 p=0.0001 HS	t=24.362 p=0.0001 HS	t=10.347 p=0.0001 HS	t=31.423 p=0.0001 HS	t=1.442 p=0.1799 NS
Protien (mg/gm)	16.1±0.1673	18.4±0.1095	21.25±0.1643	14.77±0.120	t=26.871 p=0.0001 HS	t=54.734 p=0.0001 HS	t=78.015 p=0.0001 HS	t=50.820 p=0.0001 HS	t=76.357 p=0.0001 HS	t=35.357 p=0.0001 HS

Values are Mean ± SEM

Table No: Showing the effect of the drugs on Spermatogenic elements

n=06

Spermatogenic Elements	After Administration of Drugs				G I v/s G IV	G II v/s G IV	G III v/s G IV	G I v/s G II	G I v/s G III	G II v/s G III
	G I	G II	G III	G IV						
Spermatogonia	91.83±7.00	101.0±1.10	102.42±0.976	90.17±8.35	t=0.37 p=0.717 NS	t=3.15 p=0.025 S	t=3.58 p=0.016 HS	t=3.17 p=0.025 S	t=3.68 p=0.014 HS	t=2.46 p=0.033 HS
Spermatocytes	173.3±12.1	174.67±1.63	204.86±2.79	172.8±12.0	t=0.07 p=0.944 NS	t=0.37 p=0.726 NS	t=6.39 p=0.001 HS	t=0.27 p=0.80 NS	t=6.24 p=0.002 HS	t=24.17 p=0.00 HS
Spermatids	204.83±8.35	217.5±2.17	228.29±2.14	205.00±8.20	t=0.003 p=0.973 NS	t=3.6 p=0.015 HS	t=6.76 p=0.001 HS	t=3.60 p=0.016 HS	t=6.69 p=0.001 HS	t=9.00 p=0.00 HS
Spermcount (mil/susp)	48.72±4.48	46.17±1.97	53.3±0.906	46.50±4.48	t=0.86 p=0.413 NS	t=0.17 p=0.873 NS	t=3.66 p=0.015 HS	t=1.28 p=0.249 NS	t=2.47 p=0.057 S	t=8.17 p=0.00 HS

Values are Mean ± SE

Table No: Showing the effect of the drugs on micrometric changes of testis

n=06

Micrometric Changes of the Testis	After Administration of Drugs				G I v/s G IV	G II v/s G IV	G III v/s G IV	G I v/s G II	G I v/s G III	G II v/s G III
	G I	G II	G III	G IV						
Diameter of Testis (µm)	7833±480	9333.3±81.6	10200±300	7833±484	t=0.00 p=1.00 NS	t=7.48 p=0.001 HS	t=10.38 p=0.000 HS	t=10.45 p=0.000 HS	t=7.33 p=0.00 HS	t=7.54 p=0.001 HS

Values are Mean ± SEM

Table Showing the effect of the drugs on micrometric changes of seminiferous tubule

n=06

Micrometric Changes of the tubules	After Administration of Drugs				G I v/s G IV	G II v/s G IV	G III v/s G IV	G I v/s G II	G I v/s G III	G II v/s G III
	G I	G II	G III	G IV						
Diameter of tubules (µm)	183.7±12.1	205.67±1.51	209.14±1.07	183.3±12.3	t=0.05 p=0.963 NS	t=4.41 p=0.007 HS	t=5.11 p=0.004 HS	t=4.42 p=0.007 HS	t=5.14 p=0.004 HS	t=4.73 p=0.001 HS

Values are Mean ± SEM

Table Showing the effect of the drugs on reproductive accessory organs.**n=06**

Effects of drugs on accessory organs	After Administration of Drugs				G I v/s G IV	G II v/s G IV	G III v/s G IV	G I v/s G II	G I v/s G III	G II v/s G III
	G I	G II	G III	G IV						
Weight of Testis	1.338± 0.068	1.39± 0.0110	1.4371± 0.0214	1.345± 0.046	t=0.20 p=0.849 NS	t=2.31 p=0.069 NS	t=4.48 p=0.004 HS	t=1.82 p=0.129 NS	t=3.38 p=0.020 S	t=5.10 p=0.001 HS
Epididymis	0.425± 0.027	0.4566 ±0.005	0.510± 0.020	0.416± 0.0258	t=0.54 p=0.601 NS	t=3.72 p=0.014 HS	t=7.20 p=0.00 HS	t=2.78 p=0.039 S	t=6.30 p=0.00 HS	t=6.00 p=0.00 HS
Seminal Vesicles	0.2933± 0.0242	0.368± 0.129	0.3429± 0.0243	0.2833 ±0.0207	t=0.77 p=0.461 NS	t=1.59 p=0.172 NS	t=4.77 p=0.001 HS	t=1.40 p=0.221 NS	t=3.67 p=0.0014 HS	t=0.48 p=0.654 NS
Prostate	0.0533± 0.0082	0.0750 ±0.008	0.0643± 0.00535	0.050± 0.0089	t=0.67 p=0.517 NS	t=5.00 p=0.001 NS	t=3.42 p=0.011 HS	t=4.54 p=0.001 HS	t=2.81 p=0.02 S	t=2.70 p=0.027 S
Vas Deferens	0.0500± 0.0082	0.0566 ±0.0052	0.0683± 0.00408	0.0450± 0.0105	t=0.89 p=0.392 NS	t=2.44 p=0.044 S	t=5.00 p=0.002 HS	t=1.58 p=0.153 NS	t=4.57 p=0.004 HS	t=4.34 p=0.002 HS

Values are Mean ± SEM

Discussion & Conclusion:

- All the samples of test drug have shown significant spermatogenic activity.
- Effect of GIII PP (High dose) was significant than GI, GII, GIV Panchamrita parpati us in different condition of male infertility.
- In total spermatogenic activity and improve motility, cell division production of sex hormones and spermatocytes to spermatozoa.
- The effect may be due to Balya, Brumhana, Rasayana and Vrushya properties and chemical components of Panchamrita parpati