

Research Article

Effect of “Suvarna Bhasma” (Gold Ash), an Indigenous Ayurvedic Preparation, on Human Sperm Motility

Kalanhlot Padmanabhan Skandhan^{1*}, Eashwaran Nampoodiri Manesh¹, Niranjan Rao¹, Buduru Sreenivasa Prasad², and GurdipSingh²

¹Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurveda University, India

²KLEU Shri BMK, Ayurveda Mahavidyalaya, India

***Corresponding author**

Kalanhlot Padmanabhan Skandhan, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurveda University, @902 VC Valley Apt. Kakanad, Cochin 682 037, India, Email: kpskandhan@gmail.com

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Abstract

Ayurveda physicians prescribed Suvarna Bhasma (Gold Ash) (SB) in selected male infertile patients and the result showed their total sperm count and percentage of motility increased. In this experimental study, we attempted to find out the effect of this drug, SB, on sperm motility. When SB above the level of 100 µg/ml in saline was added to normal semen, all sperms turned immotile. Adding 50 or 10 µg/ml increased the longevity of cells and progressive and non-progressive sperm motility. Result with 10 µg/ml was better.

INTRODUCTION

Infertility is a major problem for patients as well as clinicians. Among this, male factor responsible is increasing in number worldwide [1]. Male infertility rate in this region is high [1-4]. Causes for it may be due to smoking [5,6], alcohol consumption [6,7] or exposure to various occupational and environmental metals [6,8-10]. Mental anxiety, stress and obesity due to present lifestyle are also probable responsible factors [6].

Modern Medical Science successfully treats many of these patients. Complementary and alternative medicines are recognized for providing solutions for all conditions and diseases which is in practice since more than 7000 years [11]. Yoga therapy is now recognized as a solace for reducing mental stress [6].

Ayurveda, the ancient system of medicine has been in practice since thousands of years. It is described in Veda, the known oldest writing [12]. Ayurvedic formulations are herbo-metallo-mineral or animals in origin [13]. It offers wide range of treatment modalities for all health problems. Ayurveda prescribes different types of medicines including decoction, tablets, powder, and for application oil or paste, as per patient's requirement. One of the ayurvedic formulation prescribed in selected cases of male infertility is “SuvarnaBhasma” (Gold Ash) (SB).

The aim of this study is to find out experimentally the effect of SB on human sperm motility.

MATERIALS AND METHODS

Glass wares used in this study were cleaned well, washed in

soap water, tap water, freshly prepared distilled water, double and triple glass distilled water. They were dried in hot air oven except volumetric wares which were kept on filter paper for drying. The laboratory where experiments were conducted was absolutely dust free.

In the present study fresh semen samples were submitted by clinically healthy donors in the age group of 22-25 years. Before participating in this study they were given the plan of study and their consent was taken. They were not taking any medicine containing gold. The donors were restricted from wearing any gold ornaments while collecting sample. Prior to semen collection they maintained an abstinence of 2-5days [14].

Sample was collected by masturbation to clean and dry glass bottles supplied by us. Semen sample was subjected to routine semen analysis [15]. Attention was paid on two patterns of sperm motility, progressive (PM) and non-progressive (NP). A constant light in laboratory and on stage of microscope was arranged [16]. A total number of 56 samples fulfilled criteria of normozoospermia and were included in this study [15]. During the period of experimental study workers did not wear any gold ornaments.

The SB, used in the study was collected from Gujarat Ayurved Vikas Mandal Pharmacy, Ahmadabad which was prepared according to third process, given in Rasamurta, a classic in Ayurveda [17]. SB in concentrations of 10000, 5000, 1000, 500, 100, 50 and 10 µg/ml in normal saline was prepared for this study. When a sample was to be tested, one ml each was taken to two test tubes, control and test. To the control 0.1ml of normal

saline was added and to the test 0.1ml of SB solution of any one desired concentration was added. Progressive (P) and non-progressive (NP) motility was studied at the beginning of study and repeated at 1hour, 2hour and 3hour. Difference in motility, if any, was noted.

RESULTS

Results showed that SB with concentration of 10,000, 5000, 1000, 500, or 100µg/ml when added to semen all sperms became immotile. SB with 50 µg/ml made changes in sperm progressive motility (P) and non-progressive motility (NP) in sperms. At the end of three hours of study, in control group (CG), P, reached 18 % from 39 %. In study group (SG) it was 23 % from 39 % showing 5 % increase in motility present at the end of three hours of study. At two hours, it was 7 % gain (Table 1). Similarly, in CG sperms with NP reached 7 % from 16 % whereas in SG it was 11 % from 16 %. In comparison there was an increase of 4 % in SG (Table 1). In CG at the end of three hours following SB with 10 µg/ml, P reached 11 % from 32 % and in SG it was 20 % from 32 %. That showed by adding 10 µg/ml the gain was 9 % (Table 1). In case of percentage of NP in C it was 7 % from 22 %. In SG it was 13 % from 22 % showing a total gain of 6 % (Table 1). In sum the addition of 10 µg/ml increased the percentage of P and NP (Table 1).

DISCUSSION

Ayurveda considers one of the causes for male infertility is abnormal semen due to changes in biological environment of sperms. This may lead to decrease in sperm motility ending in infertility. Sperm environment, seminal plasma, has organic and inorganic substances in it. Semen studies on the level of minerals like sodium [18-25], potassium [18-25], calcium [25-30] and magnesium [25,29-32], metals like iron [33], zinc [32,34-38], copper [37,39-41] and manganese [42] and organic substances like protein [43,44], Cholesterol [34,45,46], fructose and glucose [47-50] are supporting the theory of suitable environment of sperms. All above report showed a change in level of any of these organic or inorganic substances lead to deterioration of sperm motility. The first report of similar was from De Quatrefages [51].

The preparation of SB is done from metal gold by using cumbersome conventional procedures of trituration with herbs and repeated incineration detailed in Ayurvedic classics [17]. This tedious procedure is essential for removal of toxic effect of heavy metals [52]. SB contains 53-64% gold in it [53].

Gold was first detected in human semen in 1981 [54]. Similar observation was reported in 2010 [55]. The level of gold in semen differed at different places [56,57]. The metal gold is an integral part of sperm [58-60]. The level of gold in sperm pellet depended on its total number [60]. The level of the metal was less in semen, seminal plasma and sperm where sperm motility was less [60,61] leading to infertility [60].

The possible mechanism of action of SB is not given in ayurveda texts though Ayurveda Physicians are satisfied with the effect of the drug. In the present experimental study we attempted to find out the effect of SB on sperm motility. Our results were interesting. When SB was added in concentration of 10,000, 5000, 1000, 500 or 100 µg/ml to normal semen samples, all sperms became immotile. The picture was different with lower concentrations. When SB was added to semen in minimum concentrations of 50 or 10µg/ml there was an increase

in the percentage of progressive and non-progressive motile spermatozoa at each hour of the experiment till the end of three hours (Table 1, Figures 1 & 2). That indicates the minimum dose added to semen caused these beneficial effects. In the treatment with SB in infertile patients it is not known if gold enters seminal plasma part of semen during or after. Possibly during SB treatment gold enters seminal plasma which improves the sperm motility. Supporting this, our earlier report showed that the treatment with SB increased total sperm count and percentage of motility in healthy adults and majority of infertility cases [62]. This indicates SB acts at the level of seminiferous tubules and increases the production of sperm as well as the efficiency of motility. Gold was present in sperm cells of normal and clinical conditions but its functions and level of gold depended on total number of sperm cells [60].

The present experimental study showed extra SB added above the level of 50 µg/ml was not suitable for survival of sperms. We reported elsewhere gold in semen maintain a range for normal sperm motility and a deviation from this caused changes in it [60,63].

Maintaining the longevity of spermatozoa during the technical procedures of insemination and in vitro fertilization is an important necessity. Probably, here addition of SB to the sample before conducting the actual procedure may produce fruitful result. New studies are essential in this line.

CONCLUSION

In conclusion we observed the addition of SB in minimum dose of 10 or 50 µg/ml in saline to a normal ejaculate increased

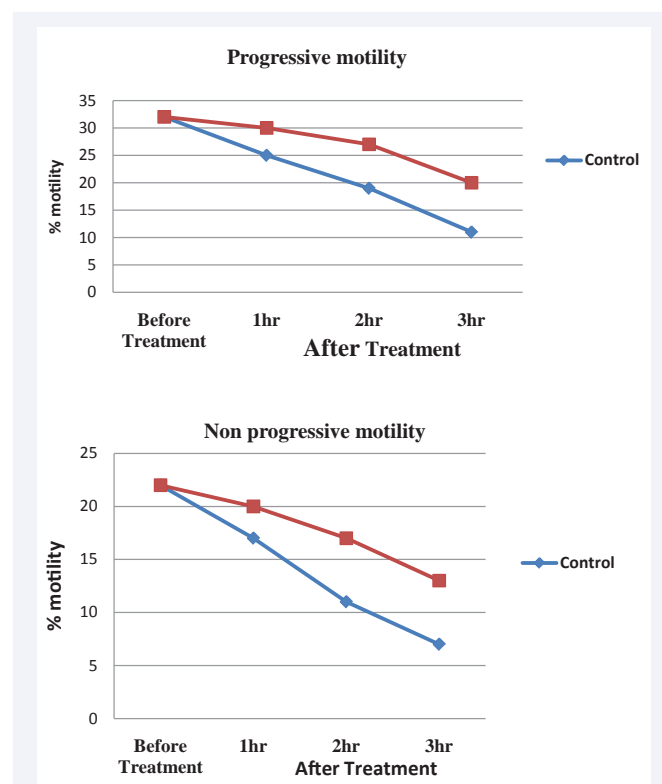


Figure 1 The effect of SB (10µg.ml) on progressive motility (a) and non - progressive motility (b) of spermatozoa.

Table 1: The result of the present study with 10 & 50µg/ml of SB in saline.

Concentration of Suvarnabhasma (GoldAsh)	Time	Sperm motility (%)					
		Progressive			Non Progressive		
		Control	Test	Difference in motility	Control	Test	Difference in motility
50µg/ml(14)	Initial	39	39		16	16	
	After 1 hr	34	37	+3	12	16	+4
	After 2 hr	23	30	+7	08	012	+4
	After 3 hr	18	23	+5	07	11	+4
10µg/ml(12)	Initial	32	32		22	22	
	After 1 hr	25	30	+5	17	20	+3
	After 2 hr	19	27	+8	11	17	+6
	After 3 hr	11	20	+9	07	13	+6

Number in parenthesis indicate total number of samples.

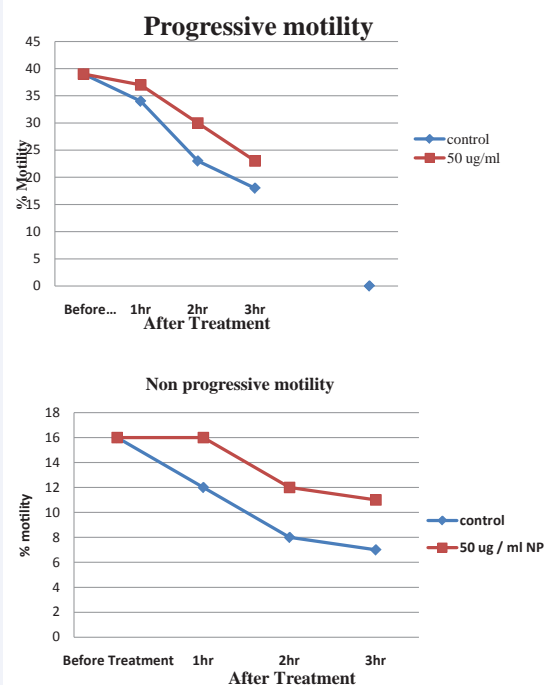


Figure 2 The effect of SB (50µg/ml) on progressive motility (a) and non progressive motility (b) of spermatozoa.

the longevity and the number of progressive and non-progressive motile sperms.

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