Austin Journal of Reproductive Medicine & Infertility

Open Access

Austin Publishing Group

Resesrch Article

Wonderful Effects of Royal Jelly on Treatment of Male-Factor Related Infertility

Ahmadnia H[1]*, Sharifi N[2], Alizadeh S[1], Roohani Z[3], Kamalati A[4] and Marjan SS[4]

[1]Department of Urology, Mashhad University of Medical Sciences, Iran

[2]Department of Pathology, Mashhad University of Medical Sciences, Iran

[3]Department of Urology, Kerman university of Medical Sciences, Iran

[4]General Physician, Mashhad University of Medical Science, Iran

***Corresponding author:** Hassan Ahmadnia, Department of Urology, Mashhad University of Medical Sciences, Mashhad, Iran

Received: August 11, 2015; **Accepted:** October 25, 2015; **Published:** October 28, 2015

Abstract

Background: Royal jelly has been used since ancient time as a supplement for nutrition, anti-aging and infertility. In this study, we consider the effect of Royal jelly on male related factor infertility in rats.

Materials and Methods: In this study we divided thirty 60-day-old male rats into two groups, control and case group. The case group gavaged 400mg/kg Royal jelly composed with honey once a day, while the control group underwent only honey. After 28 days, rats became unconscious and after blood sampling underwent bilateral orchiectomy and epididymal sperm aspiration. Then histological and hormonal evaluations were performed on samples.

Results: Spermatogenesis, count and motility of sperms were significantly higher in case group comparing to the control group, also leydig cell count meaningfully increased in case group, while sertoli cell count had no difference in both groups. LH, FSH, and testosterone serum levels had no meaningful difference in both groups.

Conclusion: We found that consumption of Royal jelly have a significant effect on sperm count and motility. It seems where there is idiopathic azoospermia, oligospermia and asthenospermia, the use of royal jelly is very effective and a significant help in treatment of infertility.

Keywords: Royal jelly; Rat; Spermatogenesis

Introduction

Royal jelly (RJ) is a thick, extremely nutritious, milky-white, creamy liquid secreted by the hypopharyngealand mandibular glands of the nurse bees [1]. For 2-3 days, royal jelly is the only food given to all young larvae in their maturation process, while for the queen larvae; it is the specific food for their whole life period. During the 3 days in which the worker bee larvae are fed on royal jelly, they reach the maximum development; their weight multiplies about 250 times. The Queen (fed only on royal jelly for her entire life) reaches maturity 5 days earlier than the worker bees; and, when she is fully grown, her weight is double that of the working bee [2]. Amazingly, the queen lives 40 times longer than worker bees, seven years as compared to seven weeks. In the wild, Queen Bees will produce 2,000 eggs per day with each day's brood equal to 21.2 times her own body weight [1]. Royal jelly is collected and sold as a dietary supplement for humans, claiming various health benefits and possess many pharmacological functions in experimental animals such as anti-oxidant [3], antibacterial [4], anti-allergic [5], antitumor [6], anti-inflammatory [7], antihypertensive [8] and anti-aging properties [9]. In humans, its oral administration promoted health and well-being in postmenopausal women [10] and improves lipoprotein metabolism and reduces serum total cholesterol and low-density lipoprotein (LDL) levels [11].

The overall composition of royal jelly is 67% water, 12.5% crude protein, including small amounts of many different amino acids, and 11% simple sugars (monosaccharides), also including a relatively high amount (5%) of fatty acids. It also contains many trace minerals, some enzymes, antibacterial and antibiotic components, B-complex vitamins such as pantothenic acid (vitamin B5) and vitamin B6 (pyridoxine) and trace amounts of vitamin C, but none of the fat-soluble vitamins, A, D, E and K. The component of royal jelly that causes a bee to develop into a queen appears to be a single protein that has been called royalactin [12]. Previous studies demonstrated that royal jelly has many health benefits. However, little and sometimes inconsistent information is available on the effects of royal jelly on the reproductive histology and sexual hormones of male animals. Additional studies on the effects and mechanisms,methods or timing of administration, and the treatment dose should be conducted in humans.

The aim of this study is the evaluation of using royal jelly on spermatogenesis, spermogram parameters, and sexual hormones in male rats.

Materials and Methods

A total of thirty 60-day-old male rats were purchased from Animal Laboratory of Medicine Center (Mashhad, Iran). The mean weight of rats was 250±20 grams. All rats were allowed access to water and food under the controlled conditions of 22±2°C temperature, 55±5% humidity and 12 hours of light and dark, respectively. We divided randomly rats into two groups, control and case group. The case group gavaged 400mg/kg Royal jelly composed with honey once a day, while the control group gavaged by same amount of only honey by special syringe. After 28 days, rats became unconscious. Carotid artery blood samples were collected in dry tubes. Serum was obtained

Citation: Ahmadnia H, Sharifi N, Alizadeh S, Roohani Z, Kamalati A and Marjan SS. Wonderful Effects of Royal Jelly on Treatment of Male-Factor Related Infertility. Austin J Reprod Med Infertil. 2015; 2(6): 1031.

Table 1: Effect of the royal jelly supplementation on histopathology of the rat testis.

Group Parameter	Control group	Royal jelly group	P Value
	Mean±SD (Min-Max)	Mean±SD (Min-Max)	
Sperm count (HPF)	25.13±14 (9-63)	141.66±52 (65-220)	< 0.001
Sperm motility	26.73±23 (0-90)	82.33±21 (25-100)	< 0.001
Leydig cell count	1.86±1.7 (0-5)	9.26±7.7 (0-25)	0.02
Sertoli cell count	10.66±5.7 (2-25)	13.26±5.4 (5-23)	0.216

The serum levels of sexual hormone, such as FSH, LH, and testosterone, were detected. As shown in Table 2, the serum hormone levels of the rats exposed to royal jelly did not differ from those of the controls.

Table 2: Serum hormone concentration.

Group Hormone	Control group	Royal jelly group	P Value
	Mean±SD(Min-Max)	Mean±SD(Min-Max)	
LH (IU/L)	0.10±0.26(0-0.5)	0.88±0.26(0-1.27)	0.74
FSH (IU/L)	0.104±0.29(0-0.97)	0.106±0.29(0-1.2)	0.80
Testosterone (ng/dl)	229±174(15-519)	217±202(70-709)	0.865

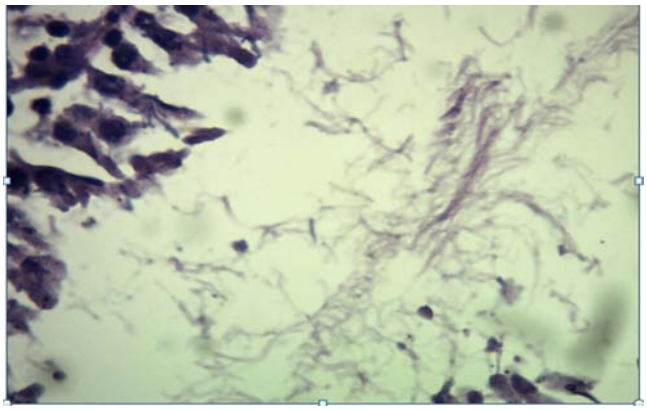

Figure 1: Seminiferous tubule of case group containing too many mature sperms (H&E *1000).

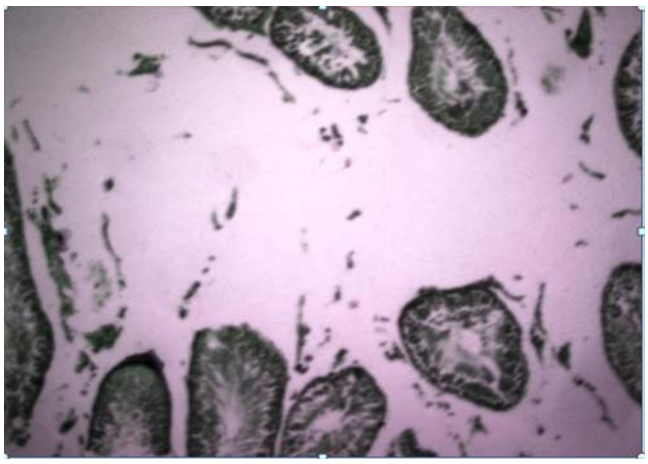

Figure 2: A cut of seminiferous tubule of control group containing a few sperms (H&E*1000).

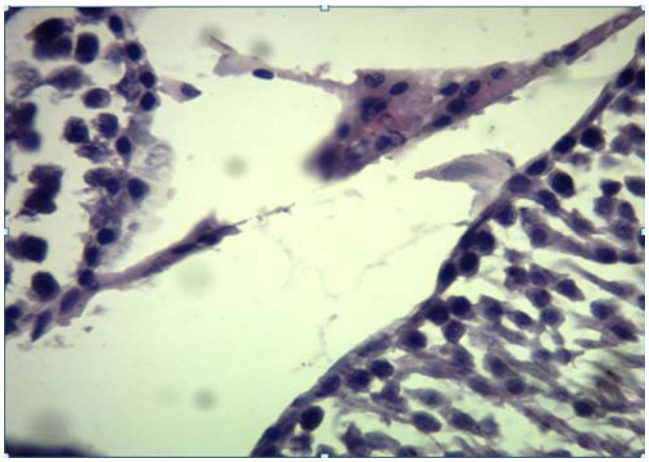

Figure 3: A cut of testis tissue of case group in interstitial region, including clusters of active mature leydig cells (H&E*100).

via centrifugation and collected for sexual hormone assay (LH, FSH, and Testosterone).

Then the rats underwent bilateral orchiectomy through abdominal midline incision. Then other organs including seminal vesicles, prostate and kidneys were removed. Each testis weight measured by sensitive scale and recorded, then epididymal sperm aspiration performed and testes send to pathology laboratory for histological evaluations. Motility of sperm on several fields oflight microscopegraded according to the WHO as: Rapid forward progressive (A); Slow or sluggish progressive (B); No progressive (C); and Immobility (D).

After collecting the results of biochemical and histological observations, the data analyzed by SPSS software. Due normally distributed data, T test was used to compare serum levels of hormones in the two groups. For ordinalqualitative data Man- Whitney test and for morphologyQ Square test was used. In all calculations, $P < 0.05$ was considered as significant.

Results

At the end of the study, the sperm count in royal jelly (case) group was significantly higher than control group (P <001). The mean count of sperms in each high power field in case group was 141, compared to the control group which was 25 (Table 1) (Figure 1,2). However, No significant changes in the sperm morphology were recorded in the treatment group compared with the control group (P=0.3).

The mean sperm motility (forward progressive: Grade A+B) in case group was 82% comparing to the control group which was 26%. It means the sperm progressive motility in case group was meaningfully higher than the control group (Table 1).

The mean count of leydig cells in each high power field in case group was 9.2 comparing to the control group which was 1.8. So the leydig cell count was significantly higher in case group rather than the control group. However, the sertoli cell count in both groups were not significantly different. (Table 1) (Figure 3).

Discussion

Infertility is a serious problem for young a couple which is increasing due to many agents. Male related factor infertility includes about 50% of infertility causes, and resolving this factor sometimes need difficult and expensive procedures. Finding an easily and less

expensive method to solve this problem would have a significant hopeful effect for infertile couples.

We know that 37% of infertile men have abnormal seminal parameters including 24% asthenospermia, 10-15% azoospermia and oligospermia. Distribution of etiology of male infertility reveals that about 23% of them are idiopathic [13]. RJ develops the queen bee gonads as Queen Bees will produce 2,000 eggs per day with each day's brood equal to 21.2 times her own body weight.

Studies have shown that orally exposure to royal jelly display estrogenic effects in adult female rats. Nakaya et al. reported that royal jelly has anti-environmental estrogen activity, which can prevent the negative effects applied by exogenous estrogen on male reproductive system [14]. Furthermore, Abdelhafiz and Muhamad found that the intravaginally administration of bee honey and royal jelly might be a probably effective method for treating infertility conducted by asthenozoospermia [15].

Kohguchi et al. shown RJ diet excited higher testosterone content and better spermatogenesis in hamster testis [16].

In another study performed on rabbits in Egypt by El nagar, spermogram parameterswere significantly improved and serum testosterone levelsincreased in heat stressed male rabbits after consumption of Royal Jelly [17]. In our study, the use of Royal Jelly has no effect on the testosterone levels in rats. But sperm quality was quite affected after use of Royal Jelly and significant changes in the number and motility of sperms was considerable.

We found that consumption of Royal jelly have a significant effect on sperm count. The mean sperm count in case group was approximately 5 times more than control group and sperm motility was significantly effective and progressive in case group. Also the leydig cell count was obviously more in the group used Royal jelly. Using Royal jelly had no effect on LH, FSH and testosterone serum level. In only one similar study performed on rats in china by Yang and his colleagues, their results showed using Royal jelly has no significant effect on sperm count [18]. We evaluate the effect of royal jelly on histology of testis, spermogram parameters and sexual hormones in male rats carefully. In our opinion if we could generalize the animal results to human, consumption of Royal jelly would be useful for infertile men suffering idiopathic azoospermia, oligospermia and asthenospermia.

According to many properties of Royal Jelly and its positive impact on sperm parameters and testicular histology in the treatment of infertility due to male factor, we recommend that a study is also done to assess the effects of Royal Jelly in female rats.

Conclusion

Royal jelly consumption can improve the seminal parameters especially the sperm count and motility also could be effective on microscopic structure of the testis by increasing the mature and active leydig cells. These effects would be useful for infertile men who have low sperm count and weak sperm motility to help them for fertility.

Acknowledgment

The authors would like to thank Dr. Seyyed Farid Khalifehloo for final English editing.

References

1. What is Royal jelly? 2012. mht. 2013.
2. Royal jelly. 2012. 2013.
3. Nakajima Y, Tsuruma K, Shimazawa M, Mishima S, Hara H. Comparison of bee products based on as says of antioxidant capacities. BMC Complement Altern Med. 2009; 9: 4.
4. Tseng JM, Huang JR, Huang HC, Tzen JT, Chou WM, Peng CC. Facilitative production of an antimicrobial peptide royalisin and its antibody via an artificial oil-body system. Biotechnol Proq. 2011; 27: 153–161.
5. Okamoto I, Taniguchi Y, Kunikata T, Kohno K, Iwaki K, Ikeda M, Kurimoto M. Major royal jelly protein 3 modulates immune responses *in vitro* and in vivo. Life Sci. 2003; 73: 2029–2045.
6. Townsend GF, Morgan JF, Tolnai S, Hazlett B, Morton HJ, Shuel RW. Studies on the *in vitro* antitumor activity of fatty acids. I. 10-Hydroxy-2-decenoic acid from royal jelly. Cancer Res. 1960; 20: 503–510.
7. Kohno K, Okamoto I, Sano O, Arai N, Iwaki K, Ikeda M, et al. Royal jelly inhibits the production of proinflammatory cytokines by activated macrophages. Biosci Biotechnol Biochem. 2004; 68: 138–145.
8. Park HM, Cho MH, Cho Y, Kim SY. Royal jelly increases collagen production in rat skin after ovariectomy. J Med Food. 2012; 15: 568–575.
9. Tokunaga KH, Yoshida C, Suzuki KM, Maruyama H, Futamura Y, Araki Y, et al. Antihypertensive effect of peptides from royal jelly in spontaneously hypertensive rats. Biol Pharm Bull. 2004; 27: 189–192.
10. Yakoot M, Salem A, Omar AM. Effectiveness of a herbal formula in women with menopausal syndrome. Forsch Komplementm.ed. 2011; 18: 264–268.
11. Guo H, Saiga A, Sato M, Miyazawa I, Shibata M, Takahata Y, et al. Royal jelly supplementation improves lipoprotein metabolism in humans. J NutrSciVitaminol (Tokyo). 2007; 53: 345–348.
12. Royal jelly. 2012. Accessed Apr 06, 2013.
13. Sabanegh E, Agarwal A. Male infertility. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Pethers CA, editors. Campbell-Walsh Urology.10th ed. Saunders Elsevier. 2012; 1: 616-645.
14. Nakaya M, Onda H, Sasaki K. Effect of royal jelly on bisphenol Ainduced proliferation of human breast cancer cells. Biosci Biotechnol Biochem. 2007; 71: 253–255.
15. Abdelhafiz AT, Muhamad JA. Midcyclepericoitalintravaginal bee honey and royal jelly for male factor infertility. Int J Gynaecol Obstet. 2008; 101: 146-149.
16. Kohguchi M, Inoue S, Ushio S, Iwaki K, Ikeda M, Kurimoto M: Effect of royal jelly diet on the testicular function of hamsters. Food Sci Technol Res. 2004; 10: 420–423.
17. Elnagar SA. Royal jelly counteracts bucks 'summer infertility'. Animrepord sci. 2012; 121: 174-180.
18. Yang A, Zhou M, Zhang L. Influence of royal jelly on the reproductive function of puberty male rats. Food chem. Toxicol. 2012 ; 50: 1834-1840.

Austin J Reprod Med Infertil - Volume 2 Issue 6 - 2015
ISSN : 2471-0393 | www.austinpublishinggroup.com

Citation: Ahmadnia H, Sharifi N, Alizadeh S, Roohani Z, Kamalati A and Marjan SS. Wonderful Effects of Royal Jelly on Treatment of Male-Factor Related Infertility. Austin J Reprod Med Infertil. 2015; 2(6): 1031.