

FINASTERIDE AND SPERM CONCENTRATION REVIEW ARTICLE

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Abstract: Background: Finasteride is approved treatment for androgenetic alopecia and benign prostatic hypertrophy. It may have an effect on sperm, however the data is lacking. Few published papers described the association between 1mg/day of finasteride treatment for androgenetic alopecia and sperm.

Objective: Reviewing all articles describing the association between treatment of finasteride (1mg/day) for androgenetic alopecia and sperm concentration.

Methods: Comprehensive literature review using PubMed as a search engine from 1980-present.

Main outcome measures: Sperm concentrations during treatment and after treatment are the main outcome measures of this analysis.

Results: Seven papers were found on PubMed using the mentioned keywords on the management of androgenetic alopecia giving a total of 113 subjects in all papers. No baseline sperm concentration was measured except for one paper. All papers but one (n=22) showed increase in sperm concentration after cessation of finasteride. However, the largest study (n=91) had baseline, during and post treatment measurements of sperm and showed no change in sperm concentration level.

Conclusion: The analysis of reviewed papers showed that long-term treatment with finasteride is safe on sperm concentration. However, there are some signs of short-term effect during treatment.

Keywords: Finasteride, Sperm, Concentration, Fertility, Sexual, Spermatogenesis.

1. INTRODUCTION

Finasteride is a specific 5-alpha reductase inhibitor, necessary for the metabolism of testosterone into dihydrotestosterone ⁽¹⁾. The dihydrotestosterone level directly affects prostate development, and finasteride was found to decrease the volume of prostate ⁽¹⁾. Approved originally for the treatment of benign prostatic hypertrophy at a dose of 5mg/day and the treatment of androgenetic alopecia in men at a dose of 1mg/day ⁽¹⁾. Reduction in dihydrotestosterone level results in a significant improvement of hair growth and density ⁽¹⁾. Prevalence of androgenetic alopecia is considered to be high, reaching around 30% for men in their 30s, 40% for men in their 40s and 50% for men in their 50s ⁽²⁾. Due to the involvement of finasteride in testosterone metabolism, many concerns were raised regarding this drug. The use of Finasteride has shown in the literatures to cause sexual dysfunction symptoms, decrease libido and erectile dysfunction are among the most common symptoms patients present with ⁽³⁾. There is scarcity of published papers discussing the daily use of finasteride for androgenetic alopecia and its effect on sperm concentration and fertility. The goal of this paper is to collect the published papers regarding this topic, review and discusses them to find out whether or not the (1mg/day) treatment of finasteride has a negative effect on sperm concentration and fertility.

2. METHODS

Comprehensive literature review using PubMed as a search engine and reviewing English articles that were published about human subjects from 1980-present. Using these keywords “finasteride”, “sperm”, “Concentration”, “fertility”, “sexual” and “Spermatogenesis”.

3. RESULTS

Seven papers were found on PubMed using the mentioned keywords on the management of androgenetic alopecia (1mg/day), five case reports and two research article giving a total of 113 subjects in all papers (Table 1) ^(5,6,7,8,9,10,11). Three case reports with only one subject ^(8,9,10), one case report with two subjects ⁽⁷⁾ and one case report with three subjects ⁽⁶⁾. The first research article was a randomized double-blind placebo-controlled study in which 91 subjects received 1mg/day of finasteride for 48 weeks ⁽⁵⁾. Baseline sperm concentration level was measured only in this paper and it showed that chronic treatment doesn't affect spermatogenesis and there is no significant difference between pre, during and post treatment sperm concentration measurements ⁽⁵⁾. The second research article contains 14 subjects ⁽¹¹⁾, they categorized them in three groups, the first one has seven subjects with sperm concentration during treatment ($<5 \times 10^6$), the second category has two subjects with sperm concentration ($5-15 \times 10^6$) and the last group has five subjects with ($>15 \times 10^6$) sperm concentration ⁽¹¹⁾. No baseline sperm concentration was measured in all papers except for Overstreet et al. paper ⁽⁵⁾. All of them have sperm concentration measurement during the treatment and measurement following up. All papers (n=22) except for Overstreet et al. paper ⁽⁵⁾ (n=91) showed increase in sperm concentration of all subjects after cessation of finasteride without any specific pattern or value in increment (Table 1). The average treatment period is 4.67 years, the shortest period was 1 year and longest period was 10 years. The average period after treatment until sperm concentration measured is 9 months, the shortest period was 4 months and the longest period was 15 months. 15 subjects of the 113 (13%) were having abnormal sperm concentration during treatment, 3 subjects were Azoospermic (absence of sperms or unable to detect), 12 subjects were Oligospermic ($<15 \times 10^6$ /mL) and 98 were having normal sperm concentration measurements. After treatment, 11 out of the 15 (73%) regain total recovery in their sperm concentration levels. All these values were documented despite subjects having healthy status or minor health issues.

4. DISCUSSION

Overstreet et al. paper is the oldest paper in the literature (1999) and it is the only one, which had baseline sperm concentration level ⁽⁵⁾. It is also the only paper, which reported no significant difference in sperm concentration levels in relation with finasteride, although it reported some sexual side effects with treatment such as decrease libido and erectile dysfunction ⁽⁵⁾. It is a very well designed study that was supported by Pfizer Company, the manufacturer of finasteride ⁽⁵⁾. All of the other papers showed consensus improvement in sperm concentration measures after cessation of the drug, but there aren't measurements of baseline sperm concentration to compare. Seventy three percent of those abnormal during treatment returned to normal sperm concentration level after stopping the medication. Apart from Overstreet et al. paper, we don't have baseline sperm concentration levels to the rest of the subjects, especially for those who were abnormal during treatment. J. Amory et al. ⁽⁴⁾ published a paper about the use of 5mg/day of finasteride for benign prostatic hyperplasia and their result showed that finasteride had a negative effect on sperm concentration, but sperm levels returned almost to their baseline level (which were taken) after 6 months of stopping the medication. We think that if it returned in 5mg/day to baseline level it will have the same result in our case (1mg/day) if not even better. Maybe those who still abnormal after stopping the medication (27%) were already abnormal even before starting finasteride, and they just returned to their normal sperm concentration levels after they stopped the medication. The paucity of papers in such an important matter might be a reflection to either difficulty in assessing sperm concentration level in dermatology clinic settings or because of unpublished belief from dermatologist of the safety of 1mg/day of finasteride as a treatment for androgenetic alopecia based on Overstreet et al. paper ⁽⁵⁾. Regarding fertility, we noticed that pregnancy occurred spontaneously after long term using the drug ^(9,10,11). One case achieved pregnancy with his wife after 5 months of stopping the medication after using finasteride for 10 years ⁽⁹⁾. Another case achieved spontaneous conception after 11 months of cessation the drug that he has been using for 8.5 years ⁽¹⁰⁾. Another two cases had successful pregnancies, one

during the treatment and one after drug cessation ⁽¹¹⁾. Long-term treatment with finasteride doesn't seem to affect fertility. Couples who want to conceive need to discuss the situation with their doctor and might consider stopping finasteride to achieve conception. Finasteride is well known to have sexual side effects from past literature; erectile dysfunction and decreased libido are among the most symptoms patients present with ⁽³⁾.

5. CONCLUSION

This analysis showed that finasteride has a good safety profile on sperm concentration levels. However, there are signs of short-term effect during treatment. It might not be exactly clear how due to the lack of baseline sperm concentration levels. We need larger scale researches in the future with baseline sperm concentration levels to determine the exact effect of finasteride on sperm.

Declaration of Interest:

The authors have no conflict of interest to declare.

REFERENCES

- [1] Varothai S, Bergfeld WF. Androgenetic Alopecia: An Evidence-Based Treatment Update. *Am J Clin Dermatol.* 2014 Jul;15(3):217-30.
- [2] Wang TL, Zhou C, Shen YW, Wang XY, Ding XL, Tian S. Prevalence of androgenetic alopecia in China: A community-based study in six cities. *Br J Dermatol.* 2010 Apr;162(4):843-7.
- [3] Irwig MS, Kolukula S. Persistent sexual side effects of finasteride for male pattern hair loss. *J Sex Med.* 2011 Jun;8(6):1747-53.
- [4] Amory JK, Wang C, Swerdloff RS, Anawalt BD, Matsumoto AM, Bremner WJ, Walker SE, Haberer LJ, Clark RV. The effect of 5 α -reductase inhibition with dutasteride and finasteride on semen parameters and serum hormones in healthy men. *J Clin Endocrinol Metab.* 2007 May;92(5):1659-65.
- [5] Overstreet, J. W., Fuh, V. L., Gould, J., Howards, S. S., Lieber, M. M., Hellstrom, W., Shapiro, S., Carroll, P., Corfman, R. S., Petrou, S. Chronic treatment with finasteride daily does not affect spermatogenesis or semen production in young men. *J Urol.* 1999 Oct;162(4):1295-300.
- [6] Collodel G, Scapigliati G, Moretti E. Spermatozoa and chronic treatment with finasteride: a TEM and FISH study. *Arch Androl.* 2007 Jul-Aug;53(4):229-33.
- [7] Liu KE, Binsaleh S, Lo KC, Jarvi K. Propecia-induced spermatogenic failure: a report of two cases. *Fertil Steril.* 2008 Sep;90(3):849.e17-9.
- [8] Chiba K, Yamaguchi K, Li F, Ando M, Fujisawa M. Finasteride-associated male infertility. *Fertil Steril.* 2011 Apr;95(5):1786.e9-11.
- [9] Ricci G, Martinelli M, Luppi S, Lo Bello L, De Santis M, Skerk K, Zito G. Finasteride and fertility: case report and review of the literature. *J Drugs Dermatol.* 2012 Dec;11(12):1511-3.
- [10] Şalvarci A, Istanbuluoğlu O. Secondary infertility due to use of low-dose finasteride. *Int Urol Nephrol.* 2013 Feb;45(1):83-5.
- [11] Samplaski MK, Lo K, Grober E, Jarvi K. Finasteride use in the male infertility population: effects on semen and hormone parameters. *Fertil Steril.* 2013 Dec;100(6):1542-6.
- [12] Cooper TG, Noonan E, von Eckardstein S, Auger J, Baker HW, Behre HM, Haugen TB, Kruger T, Wang C, Mbizvo MT, Vogelsong KM. World Health Organization reference values for human semen characteristics. *Hum Reprod Update.*

APPENDIX – A

Table (1)

Author	Subject	Treatment Duration	After Treatment	Sperm Concentration x(10 ⁶)/mL Normal sperm concentration (>15 x10 ⁶ /mL) ⁽¹²⁾		
				Baseline	During	After
J. Overstreet*	91	1 year	15 months	56	53	47
G. Collodel	3	5 years	12 months		Azoospermia**	1.23 +/- 0.35
					92 +/- 11.13	112.58 +/- 19
					27.12 +/- 4.09	38.41 +/- 7.25
K. Liu	2	2 years	6 months		Azoospermia	5.5
		3 years			4	18.7
K. Chiba	1	1 year	4 months		Azoospermia	10
G. Ricci	1	10 years	12 months		3.5	9
A. Salvarci	1	8.5 years	8 months		4.5	17
M. Samplaski	7 (<5x10 ⁶)	4.7 years	6.45monts		1.48 +/- 1.15	23.54 +/- 12.26
	2 (5-15x10 ⁶)				10.98 +/- 0.55	149.85 +/- 16.12
	5 (>15x10 ⁶)				84.14 +/- 42.74	264.43 +/- 137.47

* This paper sponsored by Pfizer company (manufactured of Propecia).

** Absence of sperms or unable to detect.