

Finasteride and sperm concentration: Rapid systematic review

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Abstract

Background Finasteride is approved treatment for androgenic 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 androgenic alopecia and sperm.

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

Methods Comprehensive literature review using PubMed as a search engine from 1980 till 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 androgenic 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.

Key words

Finasteride, sperm, concentration, fertility, sexual, spermatogenesis.

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 It is

approved originally for the treatment of benign prostatic hypertrophy at a dose of 5mg/day and the treatment of androgenic alopecia in men at a dose of 1 mg/day.¹ Reduction in dihydrotestosterone level results in a significant improvement of hair growth and density.¹ Prevalence of androgenic 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; decrease libido and erectile dysfunction are among the most

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common symptoms patients present with.³ There is scarcity of published papers discussing the daily use of finasteride for androgenic 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 discuss them to find out whether or not the (1 mg/ day) treatment of finasteride has a negative effect on sperm concentration and fertility.

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”.

Results

Seven papers were found on PubMed using the mentioned keywords on the management of androgenic alopecia (1mg/day), five case reports and two research articles giving a total of 113 subjects in all papers (Table 1).⁵⁻¹¹ Three case reports with only one subject,⁸⁻¹⁰ one case report with two subjects⁷ 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 (<5x10⁶), the second category has two subjects with sperm concentration (5-15x10⁶) and the last group has five subjects with (>15x10⁶) 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.

Table 1 Sperm Concentration of All Subjects After Cessation of Finasteride

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.

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 x10⁶/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.

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 sperm count 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 androgenic alopecia based on Overstreet *et al.* paper.⁵ Regarding fertility, we noticed that pregnancy occurred spontaneously after long term using the drug.⁹⁻¹¹ 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

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.

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