Short Communication

Improvement in Human Semen Quality After Oral Supplementation of Vitamin C

Mohammed Akmal, J.Q. Qadri, Noori S. Al-Waili, Shahiya Thangal, Afrozul Haq, and Khelod Y. Saloom

Dubai Specialized Medical Center & Research Labs, Dubai; Medical Research & Specialized Testing Centre, Mafraoq Hospital, Abu Dhabi, United Arab Emirates; and Al-Waili’s Foundation for Science and Trading, Queens, New York

ABSTRACT This study was carried out to monitor the effect of oral supplementation of vitamin C on various semen parameters in oligospermic, infertile, otherwise healthy individuals. Various semen parameters, including sperm motility, sperm count, and sperm morphology, were studied before and after the vitamin C treatment. A total of 13 infertile patients were included. Their ages ranged between 25 and 35 years. They had no genital infection or varicocele. Physical examination and routine laboratory investigations were normal. General semen analysis revealed oligospermia (mean sperm count was 14.3 ± 7.38 x 10^6 sperm/mL, mean sperm with normal morphology was 43 ± 7.87%, and mean sperm motility was 31.2 ± 8.61%). Testicular biopsy was not done. These patients received in an open trial of 1,000 mg of vitamin C twice daily for a maximum of 2 months. Results showed that the mean sperm count was increased to 32.8 ± 10.3 x 10^6 sperm/mL (P < .001) after 2 months of vitamin C intake. The mean sperm motility was increased significantly to 60.1 ± 7.47% (P < .001), and mean sperm with normal morphology increased significantly to 66.7 ± 4.77% (P < .001). This study showed that vitamin C supplementation in infertile men might improve sperm counts, sperm motility, and sperm morphology and might have a place as an additional supplement to improve the semen quality towards conception.

KEY WORDS: infertility, morphology, sperm count, sperm motility, vitamin C

INTRODUCTION

Male infertility accounts for 40% of infertility problems. The therapeutic approach to improving male fertility involves correcting underlying nutritional imbalances to encourage optimal sperm production and function. A number of nutritional therapies have been shown to improve sperm counts and sperm motility, including carnitine, arginine, zinc, selenium, and vitamin B12. Acupuncture, as well as specific botanical medicines, has a positive effect on sperm parameters. Numerous antioxidants have also proven beneficial in treating male infertility, such as vitamin C, vitamin E, glutathione, and coenzyme Q10. In comparison with clomiphine citrate, vitamin C would seem a preferable and cheaper alternative treatment for male infertility. Vitamin C was used with corticosteroids to reduce or even eliminate the effects of the immune factors on infertility in 1,020 female patients with primary or secondary infertility. Ascorbic acid reversed cyclophosphamide-induced testicular gametogenic and androgenic disorders as well as testicular oxidative stress. Normozoospermic patients showed lower ascorbic acid levels than controls. Seminal plasma ascorbic acid was positively correlated with the percentage of spermatozoa with normal morphology. Vitamin C protects sperm from oxidative damage, and improves sperm quality in smokers. It is also effective in treating sperm agglutination, a condition that causes sperm to stick together. It was found that 1 g of vitamin C, taken daily, helps to increase fertility in men who have problems with sperm agglutination. Men who lack vitamin C are also more likely to pass on genetically damaged sperm that can cause birth defects. However, one study showed that there was no clinical evidence of any beneficial effect of ascorbic acid on in vitro fertilization-embryo transfer during the luteal phase in infertility treatment. Peroxidative damage induced by reactive oxygen species (ROS) has been proposed as one of the major causes of defective sperm function. Damaged DNA may not prevent fertilization from occurring but may lead to fetal abnormalities that will only be apparent later. A major source of damage to DNA is by ROS. Infertility may be linked to DNA dam-

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Address reprint requests to: Noori S. Al-Waili, M.D., Ph.D., C.M.T., D.O.G., Clinical Research Director, Al-Waili's Foundation for Science and Trading, Queens, NY, USA. E-mail: noori@tt.com

440
age, as the sperm DNA of infertile patients has been shown to be more susceptible to damage in vitro than DNA from fertile men. It has been shown that spermatozoa are capable of generating ROS such as the superoxide anion (O$_2^-$), which subsequently forms H$_2$O$_2$ under the influence of intracellular superoxide dismutase. In seminal plasma, ascorbate, urate, and thiols are the major antioxidants present. It has been found that supplementation in vitro with the antioxidants ascorbate, urate, and α-tocopherol separately has beneficial effects for sperm DNA integrity. Both ascorbic acid and α-tocopherol protected sperm DNA against oxidative damage. In this study we have investigated the effect of vitamin C on the sperm count and morphology in infertile patients.

**MATERIALS AND METHODS**

Thirteen patients with diagnosed oligospermia were selected randomly from the Urological Unit, Dubai Specialized Medical Center, Dubai, UAE. Their ages ranged between 25 and 35 years. Patients with urinary tract infection or varicocele were excluded from the study. The patients were asked to deliver two semen specimens by masturbation with an abstinence period of 5 days. Following an incubation period at 37°C to liquefy the semen, a small portion of the semen was used to carry out routine laboratory analysis on sperm count, sperm morphology, and 1-hour sperm motility (percentage values) by the hemocytometer method. The procedure was done before and after the completion of treatment. Statistical significance of results was computed and analyzed on an IBM-compatible computer using the program Freelance (Crismas System, Version 1.0, Image House A/S, Copenhagen, Denmark). The results were analyzed for significance using Student’s t test. Values of $P < .05$ were considered significant.

**RESULTS AND DISCUSSION**

Vitamin C supplementation caused a significant increase in the percentage of motile sperm from 31.2 ± 9.61% to 60.1 ± 8.47% ($P < .001$), in sperm count from 14.3 ± 7.38 × 10$^6$ to 32.8 ± 10.3 × 10$^6$ sperm/mL ($P < .001$), and in the percentage of normal spermatozoa from 43 ± 7.87% to 66.7 ± 4.77% ($P < .001$) (Table 1).

This trial has demonstrated the beneficial use of vitamin C in infertile male patients. These results are in agreement with earlier reports of Dawson et al., who reported a significant improvement in semen quality after vitamin C treatment. In the 1990s, vitamin C was the most commonly used single supplement in the United States. Vitamin C is a water-soluble vitamin and powerful antioxidant that is needed to make collagen for muscles and blood vessels. It is important for wound healing and acts as a natural anti-inflammatory. The beneficial effects of vitamin C might be ascribed to its antioxidant activity. Further blinded controlled studies are warranted to substantiate the results of this preliminary pilot study.

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**REFERENCES**


