Vitamin intake as a method for improving sperm motility scores in context of insulin resistance

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Background

Sperm quality analysis is the basic method of evaluating male fertility. Semen parameters are influenced by a number of lifestyle factors such as diet (including vitamin consumption), physical activity, sleep, or drug use (including alcohol or cigarettes). External factors such as elevated temperature in the testicular area, radiation, or environmental pollution can also worsen semen quality.

Insulin resistance in men is mostly associated with obesity and metabolic syndrome, i.e., conditions frequently connected with a decline in overall health. The impact of insulin resistance on male fertility specifically has not been widely studied, although scientific papers point to its influence on the production and level of testosterone and semen parameters. It has also been increasingly often reported that diets rich in vitamins (especially antioxidants) show a positive effect both in the case of insulin resistance and improving semen quality.

Study group

The study was conducted in 78 men with and without insulin resistance. The patients came from the KRIOBANK Infertility Treatment Clinic and the Endocrinology, Diabetology and Internal Diseases Clinic of the Medical University of Bialystok.

Results

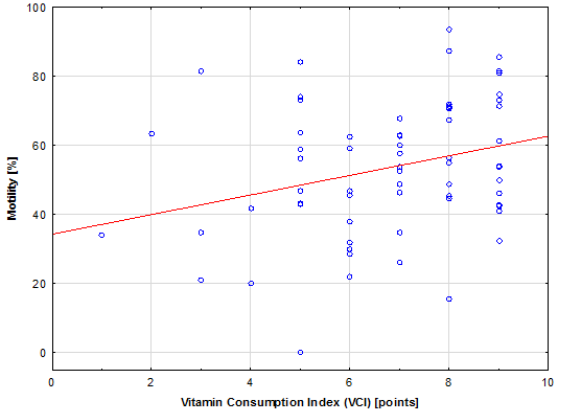
A statistically significant relationship was found between sperm motility and the presence or absence of insulin resistance in the study group. Moreover, a statistically significant positive correlation was found between sperm motility and the consumption of vitamins. Most importantly, the multivariate logistic regression model designed in the study indicates that patients with insulin resistance were 37 times less likely to achieve correct sperm motility scores compared to men without insulin resistance; patients who consumed vitamin in quantities consistent with the established norms were over 72% more likely to achieve correct sperm motility scores than men whose vitamin intake was insufficient. The model also included the duration of sexual abstinence, indicating an influence that could be diagnostically significant.

	Matsuda index IR diagnosis			
Motility	No insulin resistance	Insulin resistance	Total	**p-value**
Incorrect	3 (10.71%)	15 (33.33%)	18	0.03
Correct	25 (89.29%)	30 (66.67%)	55	
Total	28	45	73	

Relationship between the presence of insulin resistance diagnosed using the Matsuda index and sperm motility

Variable	Odds ratio	95 % confidence interval		p-value
Matsuda index	0.0271	0.0016	0.4610	0.01
VCI	1.7243	1.0680	2.7837	0.03
Sexual abstinence duration	0.0477	0.0059	0.3863	0.004

Multivariate logistic regression model in relation to sperm motility scores



Positive, strong (p=0.001; R=0.70) correlation between vitamin consumption and sperm motility

Conclusions

There is strong evidence to suggest that insulin resistance may have influence on semen parameters, motility in particular. In addition, vitamin intake also proved important for achieving correct sperm motility scores. Considering the fact that a connection was also found between insulin resistance and sperm motility and that both the Matsuda index and vitamin consumption were incorporated in the multivariate model, vitamin supplementation may constitute a viable method for the improvement of semen quality in men, especially those with insulin resistance. Therefore, studies should be performed on a larger sample of patients with and without insulin resistance to determine the influence of vitamin intake on improving fertility results.