Cigarette Smoking Is Related To A Decrease In Semen Volume In A Population Of Fertile Men

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Objective: Cigarette smoking is very common despite worldwide anti-smoking campaigns. It is considered as one of the causes of sub-fertility in males. It may result in decreased sperm concentration, poor motility and morphology, and high rates of sperm with DNA damage. However, even though many studies have shown the association of cigarette smoking with reduced semen quality in men diagnosed with infertility, however, studies evaluating the impact of smoking on the semen quality of normal fertile men are lacking. The goal of our study was to evaluate the semen quality and hormonal levels in mild, moderate, heavy and nonsmokers fertile men undergoing vasectomy for sterilization purposes.

Design: Retrospective study at a tertiary care institution. University based center.
Materials and Methods: The Institutional Review Board approved the study and all the patients provided informed consent. 889 vasectomies for voluntary sterilization purposes were performed from January 1999 to March 2003. Computer-assisted semen analysis was performed on all specimens, with a Motion Analysis (VP 50) semen analyzer. We divided the patients into four groups: non-smokers (Group A; n = 522), mild smokers (Group B, < - 10 cigarettes/day; n = 143), moderate smokers (Group C, - 11-20 cigarettes/day; n = 154), and heavy smokers (Group D, > - 20 cigarettes/day; n = 70). We evaluated sperm concentration, motility, motion parameters, and hormonal levels in these men at the time of their visit. Data was evaluated with ANOVA.

Results: No differences were seen across Groups A to D in sperm concentration (109.18 ± 76.21, 107.49 ± 86.62, 124.51 ± 87.3, and 118.41 ± 85.21; P = 0.071), motility (60.35 ± 15.67, 59.8 ± 15.79, 60.82 ± 14.42, and 53.9 ± 13.18; P = 0.678), follicle-stimulating hormone (3.67 ± 2.10, 4.021 ± 2.10, 3.40 ± 2.4, and 3.53 ± 1.57; P = 0.562), luteinizing hormone (3.32 ± 1.6, 3.66 ± 4.02, 3.03 ± 1.57, and 2.63 ± 1.17; P = 0.213), and serum total testosterone (558.59 ± 178.4, 595.26 ± 175.33, 561.23 ± 166.62, and 659.92 ± 212.67; P = 0.266). Also, sperm motion characteristics did not differ across the groups: curvilinear velocity (71.99 ± 16.44, 71.008 ± 16.37, 72.81 ± 14.41, and 70.2 ± 13.38; P =
0.828), linear velocity (40.58 ± 10.33, 39.43 ± 10.72, 39.60 ± 9.752, and 38.85 ± 7.50; \( P = 0.796 \)), linearity (55.72 ± 7.86, 54.82 ± 8.73, 53.4 ± 9.16, and 54.63 ± 8.38; \( P = 0.211 \)), lateral head displacement (3.03 ± 0.92, 3.1 ± 0.88, 3.28 ± 0.99, and 3.001 ± 0.94; \( P = 0.473 \)), and beat cross frequency (23.79 ± 6.48, 24.01 ± 4.96, 23.47 ± 7.28, and 21.74 ± 7.96; \( P = 0.499 \)). Semen volume was the only semen parameter, which tends to decrease according to the number of cigarettes smoked (2.82 ± 1.44, 2.42 ± 1.403, 2.30 ± 1.151, and 2.08 ± 0.82; \( P = 0.004 \)).

Conclusion: Semen volume tends to decrease according to the number of cigarettes smoked. A decrease in semen volume may be the first sign of semen quality impairment in cigarette smokers even before a decline in sperm concentration, percent sperm motility and normal sperm morphology.

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