JOURNAL ARTICLE

Notulae seminologicae. 5. Mathematical evaluation of interdependent submicroscopic sperm alterations

B. Baccetti, G. Bernieri, A. G. Burrini, G. Collodel, N. Crisa, M. Mirolli, E. Moretti and P. Piomboni
Institute of General Biology, University of Siena, Italy.

This paper concerns the mathematical evaluation of sperm quality as examined by electron microscopy. Proceeding with a Bayesian technique, we have developed a formula considering all statistical possibilities for defects of the examined sperm to be present in a sperm cell, the total number of affected spermatozoa, and, as consequence, that of sperm devoid of defects, also considering the probability of association characteristics of some of them. The formula has been studied in three applications. The first concerns the number of healthy spermatozoa present in ejaculates of fertile men. We have found an enormous variability, but we have observed that the minimal number of spermatozoa free of defects assuring a normal fertility seems to be a little higher than 2×10^{6}. The second and third examples concern varicocele and assisted fertilization. In both cases the formula allows a precise simultaneous evaluation of the totality of studied characters and a determination of the number of spermatozoa free from defects. This comparative analysis shows that the formula is sufficiently sensitive to distinguish the different degrees of the varicocele condition and the various possibilities of fertility power in cases of natural or artificial insemination. In this way we will easily control the level of improvement of sperm quality in cases of varicocele treated pharmacologically or surgically, or we will better predict the success of artificial insemination.

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