OVERALL SEMEN QUALITY SCORES DEVELOPED BY PRINCIPAL COMPONENTS ANALYSIS OF SEMEN CHARACTERISTICS
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Semen analyses typically produce a wide variety and number of semen characteristics that are correlated, indicating that underlying measures of semen quality can be used to reduce the number of variables evaluated. We examined sperm motion characteristics of a cross section of men to determine whether nine characteristics of sperm specimen can be reduced to one or two measures of semen quality. A cross-sectional sample of 250 men who provided semen samples was used to examine the variability among and correlation of patient semen characteristics. A separate sample of 19 donor males was used to determine normal ranges of the semen scores. Principal component analysis indicated that the semen characteristics could be summarized as two semen scores that account for 80.3% of the all of the variability among original semen characteristics. The first principal component was a weighted sum of all of the semen characteristics and accounted for 64.7% of the overall variability. This component was named “SQ” (semen quality and quantity). The second component was a weighted sum of eight of the characteristics minus concentration. This was considered a measure of relative quality (e.g., the morphology and function, given the concentration) and was thus named “RQ.” As a reference standard, the distributions of SQ and RQ among the healthy were calculated (100 ± 10). Among the sample of patients, the average SQ and RQ scores were 89.9 (min 25.1, max 130.4) and 106.1 (min 45.2, max 165.9), respectively. Semen characteristics can be reduced to two semen quality scores, which account for over 80% of the variability expressed by all of the semen characteristics individually. We believe that reducing the nine semen characteristics to the two scores will be more efficient by allowing quick comparisons of semen quality. In addition, the semen scores may provide improved assessments of male fertility. [Supported by a research grant from the Cleveland Clinic Foundation.]