PREDICTION OF SPERM CRYOSURVIVAL RATES IN CANCER PATIENTS

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Introduction and Objective: Infertility is a major sequel of cancer and/or its therapy. Patients diagnosed with cancer are often referred to sperm banks for semen cryopreservation. Poor semen quality before freezing has been associated with poor post thaw outcome. Based on our previous studies, the average sperm cryosurvival rates in fertile donors ranges from 55% to 60%. The objectives of our study were: 1) to compare the average cryosurvival rates in a group of cancer patients to fertile donors, and 2) to assess if the cryosurvival rates may be predicted by a novel semen quality (SQ) score.

Methods: Our study included 33 specimens from a group of normal healthy volunteers and 190 semen samples collected from 55 patients diagnosed with cancer (testicular cancer: n = 22; Hodgkin’s lymphoma: n = 14; and non-Hodgkin’s lymphoma: n = 19). Semen analysis was performed before freezing and sperm motion characteristics were assessed using computer assisted semen analysis. SQ score was computed using base 10 logarithms of nine sperm parameters (concentration, motility, sperm morphology according to WHO guidelines and Tygerberg’s strict criteria, VCL, VSL, VAP, LIN, and ALH). Samples were cryopreserved and stored in liquid nitrogen at –196° under identical conditions for 2 to 3 days. Sperm concentration, motility and motion kinetics were analyzed again after thawing. The cryosurvival rate was calculated based on the difference between the numbers of total motile spermatozoa (TMS) pre-freeze to TMS post-thaw.

Results: Sperm concentration, % motility, morphology by Tygerberg’s criteria and SQ scores were lower in cancer patients compared to donors (P = 0.007; 0.05; 0.03; 0.007; respectively). However, sperm cryosurvival rates in cancer patients were not significantly different compared to donors (43.7% ± 30% vs. 58.9% ± 45.8%). SQ scores showed positive correlation with post thaw cryosurvival rate (r = 0.2, P = 0.005). A SQ score cutoff value of 60 gave the highest predictive value for sperm cryosurvival rate in cancer patients (sensitivity: 90%; specificity: 78.4%; positive predictive value: 80.6%; negative predictive value: 88.7%). Conclusions: Pre-treatment semen quality in cancer patients is poor compared to healthy donors, however, their spermatozoa showed a similar degree of cryodamage (associated with freezing and thawing) as in healthy donors. Semen samples in cancer patients with SQ score below 60 are strongly associated with a poor cryosurvival rate. The SQ score may be a beneficial tool in predicting sperm cryosurvival rates in cancer patients.

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