Exploring semen quality among cancer patients

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Introduction

Anticancer treatments (surgery, radiotherapy, chemotherapy) may affect male fertility transiently or permanently [1]. Evidence suggests that the disease process itself may affect a man's fertility by influencing spermatogenesis [2]. Different study compared semen parameters of oncological patients who performed semen cryopreservation before oncological treatments with healthy men [3-7], some studies compared semen samples from patients affected by different types of tumors with conflicting results [8-21].

Objective

This retrospective cohort study aimed to assess the semen quality of cancer patients who performed semen cryopreservation at our center from 2014 to 2024 before gonadotoxic treatments.

Results

We collected data of 548 men of which 246 were affected by testicular cancer (45%), 203 by hematological cancer (37%) and 99 by solid cancer (18%). The most frequent types of hematological cancers were Hodgkin lymphoma (39%), non-Hodgkin lymphoma (16%) and leukemia (12%). Among solid cancers the most frequent were gastro-intestinal tumors (27%), tumors of nervous system (18%), sarcoma (11%), head and neck cancer (7%), and osteosarcoma (6%). Semen analysis was performed according to World Health Organization guidelines. Statistical analysis was performed by one-way ANOVA, analysis of covariance was performed by ANCOVA. Patients' age, sperm concentration and total sperm count differed among groups ($p<0.05$), while volume, total motility and progressive motility did not differ among groups. Adjusting data for age sperm concentration and total sperm count differed among groups ($p<0.001$). Patients with a testicular cancer had an impaired semen quality at diagnosis, in particular we observed a significant reduced sperm concentration and total sperm count respect to hematological ($p=<0.05$; $p=<0.05$, respectively) and solid tumor ($p=<0.05$; $p=<0.05$, respectively) patients. A sub-analysis was performed comparing semen samples of patients with testicular tumors who performed cryopreservation before (N=62) or after (N=72) orchiectomy. We did not observe any significant difference in semen parameters in samples cryopreserved before or after orchiectomy.

Conclusions

Our data confirmed that testicular cancer patients had a reduced sperm quality respect to solid and hematological cancer patients. It is reasonable that spermatogenesis impairment is likely due to local (i.e., paracrine factors, anatomic alteration of testicular tissue and hyperthermia due to inflammation) and systemic effects of tumor. In testicular cancer patients, semen cryopreservation before or after surgery offers the same chances of success and should always be performed.

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