

Should ART Patients with Severe Oligozoospermia Undergo Sperm Cryopreservation at Time of Initial Diagnosis?

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Abstract

Every experienced IVF clinician has been confronted by the scenario of a couple about to undergo ICSI for a diagnosis of severe oligozoospermia, only to find there is azoospermia on the day of oocyte collection. To establish the incidence of this disastrous event, a retrospective study of all men with an initial sperm concentration of <5 million/ml, who subsequently had at least 2 further samples collected was conducted. An analysis of the change in sperm parameters over time was undertaken. Of the 35 men identified, 31.4% (11/35) did not have any change in their sperm concentration, 20.0% (7/35) of men had an increase, and 34.3% (12/35) declined. Seven men (20.0%) became azoospermic. These findings suggest that all men with an initial sperm concentration of <5 million/ml should have cryopreservation of sperm to avoid disappointment during a later ART cycle.

Keywords: ART Patients; Oligozoospermia; Sperm cryopreservation

Introduction

Severe oligozoospermia (sperm concentration <5 million/ml) is found in less than 5% of couples presenting with infertility [1,2]. While detailed investigation is vital to indicate a cause, for the vast majority there will be no therapy to improve the situation. However the advent of Intracytoplasmic Sperm Injection (ICSI) has changed the outlook for these couples who previously would have required donor sperm to conceive. Requiring only sufficient viable sperm to singly inseminate each oocyte collected, ICSI results in pregnancy rates as good as conventional In-Vitro Fertilisation (IVF) with normal sperm parameters [3,4]. This optimism can be rapidly dashed, when at the time of oocyte retrieval, azoospermia is encountered. Most experienced IVF specialists have been placed in this difficult situation. Options exist such as attempted surgical sperm retrieval or cryopreservation of the oocytes for future insemination. The question arises as to whether freezing the severely oligospermic sample at the time of initial diagnosis, would have avoided this crisis.

McLachlan in a recent review of management of oligozoospermia suggests it would be "prudent" to cryopreserve such samples, but this practice is not widespread, probably because subsequent development of azoospermia is uncommon [5]. Two reports describe the practice and recommend its value. Song et al have suggested awaiting deterioration before cryopreservation of sperm [6]. In our clinic routine prophylactic sperm freezing in severe oligozoospermia is not standard practice. Before implementing this approach, it was decided to establish the frequency of severe oligozoospermia which subsequently became azoospermic.

Materials and Methods

Subjects

In this retrospective study, men whose semen analysis showed a sperm concentration <5 million/ml, who subsequently had at least 2 further samples in a minimum 6-month time-frame, were identified from the IVF Australia Andrology Database from 2008-2014. All semen parameters (volume, concentration, motility and morphology) were retrieved. Approval for this study was obtained from the IVF Australia Human Research Ethics Committee.

Semen collection and quality control

The subjects were instructed to produce a semen sample after a minimum of 2 days and a maximum of 7 days sexual abstinence. Patients were provided with a non-toxic plastic container, in which to collect the ejaculate. All samples were produced by masturbation either at the Andrology Laboratory or at home. Samples were processed within 1.5 hours of production.

Semen analysis

All specimens were reported according to the World Health Organisation Laboratory Manual [7]. During the study period nine technicians, all with the same training performed analysis on the specimens. All technicians participated in the National Andrology quality control program. The scientific director of the laboratories remained constant for the study period. Data collated included patient age, semen volume, sperm concentration, morphology, and motility.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics v 20.0 for windows and p-values <0.05 was considered statistically significant.

Results

76 men were identified with sperm concentrations <5million/ml. Of these 41 were azoospermic at the initial analysis and were not included in the study. Median age of the 35 men included was 36.6 years (range: 22-53). Overall mean sperm concentration fell from 2.24 to 1.55 million/ml between initial and final testing (p=0.06). In the study group 31.4% (11/35) did not have any change in their sperm

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concentration, 20.0% (7/35) of men had an increase, and 48.6% (17/35) declined. Seven men (20.0%) became azoospermic.

Discussion

The decline in sperm quality amongst men with severe oligozoospermia whilst undergoing ART cycles is of substantial importance. Of great significance is the disaster of a couple going through an ART cycle and oocyte collection, only to discover that the man with previous oligozoospermia is now azoospermic. This outcome can be distressing to the couple both financially and emotionally. In such cases, a testicular biopsy to retrieve sperm is an option. However this technique may not be immediately available and, in any case, is not always successful.

This study examining 35 men with severe oligozoospermia with at least 3 semen samples tested over a minimum follow-up period of 6 months showed no significant change in average sperm concentration although the trend was a decline. This is consistent with other reports [5-9]. In broad terms one-third (11/35) remained unchanged, one-fifth (7/35) showed a slight improvement and almost half (17/35) had a decline in their sperm concentration over time. One in five of these oligospermic males became azoospermic over the course of their IVF journey, higher than the Song study where 12.5% of their men became azoospermic [6]. In Koscinski's study [8], they found no azoospermia in severe oligospermic men but did find it in 11% with cryptospermia ie those with sperm only detectable after centrifugation. Despite our general results indicating that semen parameters do not decline significantly over time, the overwhelming 20% (7/35) of men becoming azoospermic raises the question of whether or not freezing sperm at an early stage for all men with sperm count <5 million/ml would be a reasonable insurance policy. Both Song and Koscinski recommended freezing only with declining counts with regular monitoring. Our results suggest this may miss a vital opportunity to ensure that sperm will be available for future ART cycles.

Conclusion

In conclusion, this study showed that while there is no statistically significant decline in sperm parameters in men with severe

oligozoospermia as a group, a definite decline in sperm concentration was observed in almost half of the study population. Of these, nearly 40% became azoospermic. These findings indicate that it would be wise to counsel men with severe oligozoospermia of the possible further decline in spermatogenesis. Recommendation for cryopreservation of semen samples when the initial sperm concentration is <5 million/ml, may avoid disappointment and increase the chances of conception if future ART cycles are planned.

Declarations

The authors declare no financial or any other conflict of interest with regard to the publication of this article.

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