

Live birth after posthumous testicular sperm aspiration and intracytoplasmic sperm injection with cryopreserved sperm: Case report

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Summary

Purpose: To determine if a viable pregnancy is possible after aspiration of sperm from the testes of a man several hours after his death.

Method: Following cryopreservation of the aspirated sperm, in vitro fertilization (IVF)-embryo transfer (ET) with intracytoplasmic sperm injection (ICSI) was used. The sperm selected were either those with motility or plumper non-motile sperm.

Results: Fertilization of oocytes and ET occurred following all five IVF-ET cycles. A clinical pregnancy was achieved in cycle 1 with non-motile sperm and a viable pregnancy resulted from cycle 5 with ICSI performed with viable sperm.

Conclusion: Viable pregnancies following IVF-ET and ICSI are possible even when using testicular sperm obtained posthumously.

Key words: Testicular sperm aspiration; Posthumous.

Introduction

The advent of intracytoplasmic sperm injection (ICSI) has made it possible to achieve embryo fertilization and pregnancies in extreme cases of oligoasthenozoospermia with intratesticular sperm [1, 2]. There has even been a case report of fertilization of oocytes, embryo formation and chemical pregnancy following insemination of oocytes with sperm aspirated from a man's testes many hours after death [3].

This present case report describes the first successful delivery resulting from fertilization of oocytes from sperm obtained posthumously.

Case Report

The aforementioned 35-year-old woman who had a chemical pregnancy after transfer of two embryos on day 3 including a 9-cell embryo (3), had three frozen embryos left from the first retrieval. Only two survived the thaw and the maximum cleavage stage was a 4-cell and she failed to conceive.

For the first in vitro fertilization (IVF) cycle we had scraped only 350 μ l from the frozen sperm sample that had been aspirated from the woman's 38-year-old husband several hours after his death from a heart attack. There were no motile sperm at all and we guessed which ones were viable by using the plumper ones. The fertilization rate of mature follicles was 40% (6/15).

She was stimulated for cycle 2 with luteal phase leuprolide acetate for ten days only and then given 300 IU daily of recombinant follicle stimulating hormone (FSH) (Gonal-F, Serono Inc.). Again there were no motile sperm found, but five of the 19

(26.3%) fertilized and all five embryos were cryopreserved at the 2 pronuclear stage because personal obligations precluded the transfer three days later. The method for embryo freezing was a simplified method using 2 propanediol as the cryoprotectant, a BioCool freezer, and a one-step method of thawing [4]. The five embryos were subsequently thawed and transferred on day 3 after assisted-embryo hatching [5]; four survived the thaw, and there were two 7-cell embryos with < 25% fragmentation, one 6-cell embryo with 25% fragmentation, one 6-cell embryo with 25% fragmentation, one 6-cell embryo with 25% fragmentation and a 3-cell embryo. However, she failed to conceive.

Her third oocyte retrieval occurred 13.5 months after her first one and a luteal phase leuprolide acetate - human menopausal gonadotropin (hMG)/recombinant FSH protocol was used. Again, no motile sperm were found. She fertilized ten of the 19 oocytes (52.6%) and transferred three embryos (1 was an 8-cell with < 25% fragmentation) but the other two only reached the 2-cell stage. She once again failed to conceive.

Her fourth oocyte retrieval using the same protocol as number three occurred 18 months after her first retrieval and resulted in 13 mature oocytes. This time there were some motile sperm (15%) and these were used for the ICSI procedure. She transferred on day 3 a total of three embryos including two 8-cell embryos with \leq 25% fragmentation and a 4-cell embryo, but she failed to conceive. There had been six that fertilized (46.1%), but three embryos were discarded.

She then had her fifth oocyte retrieval on 10/5/00, 27 months after her first retrieval again using the same controlled ovarian hyperstimulation protocol as cycles 3 and 4. There were 14 mature oocytes and four fertilized (28.5%). There were 14 motile sperm found and they were used for ICSI. Four embryos were transferred including a 9-cell, an 8-cell, and two 6-cell embryos all with \leq 25% fragmentation. She conceived that cycle and delivered a full term healthy baby on 6/20/01.

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Discussion

A search of the peer-reviewed literature failed to find any case reports of pregnancy following sperm obtained from testes posthumously so that we believe that this is the first one reported. However, we are aware of an apparent successful delivery that made the lay press but we are unaware of any specific details. For example we do not know what interval from death to aspiration occurred in the unreported case. One of the interesting aspects of the case we are reporting was that there was an interval of many hours before this woman could find a sperm bank willing to come out and perform the sperm aspiration with nothing special having been done with the corpse to preserve the testes for subsequent aspiration and cryopreservation.

A recent case was reported of a live birth with epididymal sperm retrieval obtained from a 27-year-old decorticate man who was still alive on life support [6]. They discuss in their report the controversial nature of the ethics of using sperm from a male who has not previously expressed his desire to allow his wife to use his sperm for procreation even after his death [7,16].

When we performed her first IVF cycle there had not been any controversy about using posthumous sperm and we never thought about the ethics of using the sperm. However, before she had her second retrieval the controversy had been made public after a case made the lay press. We presented the dilemma to the ethics committee for the Cooper Center for IVF, and the decision was made that since there were no inheritance issues at stake, that it would be inane to think that couples would have the forethought to have a written advance directive giving permission to use the sperm posthumously especially in a 38-year-old male who had been very healthy. The committee decided that implicit in most marriages is the production and the raising of a family, and if there had been any thoughts by the male partner not to have children, then this exception should have been covered by an advanced directive. The committee thus ruled that to deny this patient's request would definitely hurt a woman who was alive. Therefore, they decided it would make more sense to allow her to proceed with IVF considering all of the efforts that she had made to procure the sperm despite the shock of her husband's sudden death. The committee decided that it was not reasonable to assume that the dead male would not want his wife to raise their child. Thus by allowing the patient's IVF to proceed, the committee was not failing to protect the rights of the dead.

The patient proved that this was not merely a whimsical idea for her but persisted in having five IVF-ET cycles and six ETs with the last one occurring more than three years after her husband's death.

Perhaps, rather than having to be faced with this horrible ethical decision after a spouse's death, some system, e.g., attaching a statement with each marriage certificate, could be made where couples can at least be apprized of this possible circumstance, and they may have a better chance of writing some advanced directive giving permission to use sperm (or even oocytes) posthumously.

References

- [1] Van Steirteghem A. C., Nagy Z., Joris H., Liu H., Liu J., Staessen C. *et al.*: "High fertilization and implantation rates after intracytoplasmic sperm injection". *Hum. Reprod.*, 1993, 8, 1061.
- [2] Van Steirteghem A. C., Van der Elst J., Van den Abbeel E., Joris H., Camus M., Devroey P.: "Cryopreservation of supernumerary multicellular human embryos obtained after intracytoplasmic sperm injection". *Fertil. Steril.*, 1994, 62, 775.
- [3] Check M., Summers-Chase D., Check J. H., Choe J., Nazari A.: "Sperm extracted and cryopreserved from testes several hours after death results in pregnancy following frozen embryo transfer: case report". *Arch. Androl.*, 1999, 43, 235.
- [4] Bakır A. F., Check J. H., Hourani C. L.: "Survival and pregnancy rates of pronuclear stage human embryos cryopreserved and thawed using a single step addition and removal of cryoprotectant". *Hum. Reprod. Update*, 1997, 2 (CD-ROM), item 12.
- [5] Check J. H., Hoover L., Nazari A., O'Shaughnessy A., Summers D.: "The effect of assisted hatching on pregnancy rates after frozen embryo transfer". *Fertil. Steril.*, 1996, 65, 254.
- [6] Belker A. M., Swanson M. L., Cook C. L., Carrillo A. J., Yoffe S. C.: "Live birth after sperm retrieval from a moribund man". *Fertil. Steril.*, 2001, 76, 841.
- [7] Kerr S. M., Caplan A., Polin G., Smugar S., O'Neill K., Urowitz S.: "Postmortem sperm procurement". *J. Urol.*, 1997, 157, 2154.
- [8] Schiff A. R.: "Arising from the dead: challenges of posthumous procreation". *N. C. Law Rev.*, 1997, 75, 901.
- [9] Gilbert S.: "Fatherhood from the grave: an analysis of postmortem insemination". *Hofstra Law Rev.*, 1993, 22, 521.
- [10] Kahan S. E., Seftel A. D., Resnick M. I.: "Postmortem sperm procurement: a legal perspective". *J. Urol.*, 1999, 161, 1840.
- [11] Aziza-Shuster E.: "A child at all costs: posthumous reproduction and the meaning of parenthood". *Hum. Reprod.*, 1994, 9, 2182.
- [12] Ohl D. A., Park J., Cohen C., Goodman K., Menge A. C.: "Procreation after death or mental incompetence: medical advance or technology gone awry?". *Fertil. Steril.*, 1996, 66, 889.
- [13] Rothman C. M.: "Live sperm, dead bodies". *J. Androl.*, 1999, 20, 456.
- [14] Gottenger E. E., Nagler H. M.: "The quagmire of postmortem sperm acquisition". *J. Androl.*, 1999, 20, 458.
- [15] Ahuja K. K., Mamiso J., Emmerson G., Bowen-Simpkins P., Seaton A., Simons E. T.: "Pregnancy following intracytoplasmic sperm injection treatment with dead husband's spermatozoa: ethical and policy considerations". *Hum. Reprod.*, 1997, 12, 1360.
- [16] Strong C., Gingrich J. R., Kuttej W. H.: "Ethics of sperm retrieval after death or persistent vegetative state". *Hum. Reprod.*, 2000, 15, 739.

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