TITLE: COMPARING BLASTULATION OF SURGICALLY RETRIEVED SPERM TO EJACULATED SPERM IN DONOR OOCYTE CYCLES

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Background

Donor oocytes are a feasible option for patients with oocyte quality-related infertility, with comparable blastulation to autologous cycles (1). However, published literature focuses on donor oocytes and ejaculated sperm (1). There is one study of surgically retrieved sperm that compared obstructive (OA) and non-obstructive azoospermia (NOA) in 12 donor oocyte cycles, citing similar outcomes but excluding blastulation (2). Donor oocyte banks often include a blastocyst guarantee program, where patients receive a replacement lot if there is no available usable blastocyst for transfer (3). It is standard practice in these programs to exclude surgically retrieved sperm, largely because reported outcomes with donor oocytes using this sperm source are widely unknown (3). Research will help counsel these patients and may demonstrate that such restrictions from the guarantee programs may be unnecessary.

Objective

To evaluate blastulation from donor oocytes fertilized with surgically retrieved sperm among patients with OA or NOA compared with ejaculated sperm.

Materials and Methods

We conducted a retrospective cohort study at a large national network of fertility clinics from 2011 to August 2024 of donor oocyte cycles with ejaculated or surgically retrieved sperm. Exclusion criteria included use of donor sperm, conventional insemination, oocyte donors older than 34 years, and/or transfer of cleavage stage embryos. Primary outcome was blastulation (usable blastocysts divided by inseminated oocytes) and secondary outcomes were fertilization, clinical pregnancy, and live birth rate. Subanalyses restricting to fresh and frozen gametes were conducted. Statistical analysis was performed using modified Poisson model fitted with GEEs and adjusted *a priori* for age of male patient and oocyte donor.

Results

There were 13,248 cycles with ejaculated sperm and 218 with surgically retrieved sperm. Blastulation was 38.4% in the ejaculated group compared to 30% OA and 29% NOA (Table). This observation remained consistent when restricted to only fresh oocytes, only frozen oocytes, and when comparing fresh to frozen sperm. When compared to the ejaculated sperm fertilization of 79.2%, there was also significant decrease – 67.9% for OA and 69% for NOA (Table). However, the percentage of patients with at least one usable blastocyst for transfer was similar – 90% ejaculated cycles compared to 87% OA and 88% NOA cycles. Pregnancy outcomes were similar amongst groups.

Conclusions

When comparing blastulation using donor oocytes fertilized with surgically retrieved sperm to ejaculated sperm, there was a 20-25% reduction in likelihood of blastulation per inseminated oocyte for patients with OA and NOA, but the chance of obtaining at least one usable blastocyst was comparable. Therefore, donor oocyte banks should consider including these patients in their blastocyst guarantee programs.

Support

None

References:

1. Evidence-based outcomes after oocyte cryopreservation for donor oocyte in vitro fertilization and planned oocyte cryopreservation: a guideline. *Fertil Steril* 2021; 116: 36-47.
2. Lindheim SR, Crumm K, Fisch H, Sauer MV. Testicular sperm aspiration (TESA) and its application in oocyte donation. *Arch Androl* 2001; 46: 211-215.
3. Using Donor Egg for IVF. [cited 2024 September 16]. Available from: https://pinnacleeggbank.com/intended-parents.

TABLE

	Ejaculated Sperm N = 13248	**OA N = 144**	**NOA N = 74**
	Mean ±SD (Ref)	Mean ±SD aRR (95% CI)*	Mean ±SD aRR (95% CI)*
Number of mature oocytes inseminated per cycle	9.4 ± 5.8	9.5 ± 5.7	9.2 ± 4.9
Number of zygotes (2pn) per cycle	7.5 ± 5.1	6.6 ± 4.6	6.5 ± 4.1
Number of usable blastocysts per cycle	3.7 ± 3.3	2.9 ± 2.7	2.7 ± 2.5
Blastulation (usable blastocysts over oocytes inseminated)	38.4 ± 25.4 (Ref)	30 ± 23 0.8 (0.72, 0.9)	29 ± 23.4 0.76 (0.63, 0.91)
Fertilization (2pn over mature oocytes)	79.2 ± 25.2 (Ref)	67.9 ± 23.6 0.88 (0.84, 0.93)	69 ± 24.7 0.89 (0.83, 0.96)

*adjusted for age