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

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BACKGROUND

- Donor oocytes have comparable blastulation to autologous cycles using ejaculated sperm for fertilization (1).
- One study compared surgically-retrieved sperm of obstructive (OA) and non-obstructive azoospermia (NOA) patients in 12 donor oocyte cycles, reporting similar outcomes, **but they did not analyze blastulation** (2).
- Donor oocyte banks typically have a **blastocyst guarantee program**, where patients receive a replacement lot if there is no usable blastocyst for transfer (3). **Standard practice is to exclude surgically-retrieved sperm from these programs.**
- **Are these restrictions necessary given outcomes are unknown?**

HYPOTHESIS

Primary:

Blastulation will be similar from donor oocytes fertilized with surgically retrieved sperm (OA) to donor oocytes fertilized with ejaculated sperm, but decreased with NOA.

Secondary:

OA will be associated with a higher blastulation compared to NOA.

MATERIALS & METHODS

- Retrospective cohort study from 2011 to August 2024 within a multi-center ART network
- **Inclusion criteria:** donor oocyte cycles using ejaculated or surgically-retrieved sperm
- **Exclusion criteria:** use of donor sperm, conventional insemination, oocyte donors older than 34 years, and/or transfer of cleavage stage embryos
- **Primary outcome: blastulation** (usable blastocysts divided by inseminated oocytes)
- **Secondary outcomes:** fertilization, clinical pregnancy, live birth
- Subanalysis restricting to fresh and frozen gametes, as well as OA patients post-vasectomy was performed
- **Statistical analysis:** modified Poisson model fitted with GEEs and adjusted *a priori* for age of patients

Table 1: Embryo Development Outcomes Among Patients Using Ejaculated and Surgically Retrieved Sperm

	Ejaculated Sperm N = 13248	Obstructive Azoospermia N = 144	Non-obstructive Azoospermia N = 74
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
Cycles with at least one usable blastocyst	11942 (90.1%) Ref	125 (86.8%) 0.97 (0.91 – 1.03)	65 (87.8%) 0.98 (0.9 – 1.06)
Blastulation	38.4% ± 25.4 Ref	30.0% ± 23.0 0.80 (0.72 - 0.90)	29.0% ± 23.4 0.76 (0.63 - 0.91)
Fertilization	79.2% ± 25.2 Ref	67.9% ± 23.6 0.88 (0.84 - 0.93)	69.0% ± 24.7 0.89 (0.83 - 0.96)

Table 2: Clinical Pregnancy and Live Birth Outcomes Among Patients Using Ejaculated and Surgically Retrieved Sperm

	Ejaculated Sperm N = 11942	Obstructive Azoospermia N = 125	Non-obstructive Azoospermia N = 65
Clinical pregnancy outcome: first transfer	4939 (47.0%) Ref	54 (50.5%) 1.09 (0.9 - 1.31)	20 (35.1%) 0.76 (0.52 - 1.11)
Overall clinical pregnancy	7991 (76.1%) Ref	80 (74.8%) 1 (0.89 - 1.11)	41 (71.9%) 0.96 (0.8 - 1.14)
Live birth: first transfer	3992 (38.1%) Ref	46 (43.0%) 1.15 (0.93 - 1.43)	16 (28.1%) 0.75 (0.47 - 1.2)
Overall live birth	6734 (64.8%) Ref	67 (62.6%) 0.99 (0.85 - 1.15)	34 (59.6%) 0.94 (0.74 - 1.19)

RESULTS

- Total of 13,248 cycles with ejaculated sperm and 218 with surgically-retrieved sperm were included
- Blastulation was 38.4% (ejaculated sperm) vs 30% (OA) and 29% (NOA) (Table 1)
- These findings stayed consistent when restricting to only fresh oocytes, only frozen oocytes, and when comparing fresh to frozen sperm as the gamete source
- Fertilization was 79.2% (ejaculated sperm) vs 67.9% (OA) and 69% (NOA) (Table 1)
- However, **the percentage of patients with at least one usable blastocyst was similar:**
  - 90% (ejaculated sperm)
  - 87% (OA)
  - 88% (NOA)
- Pregnancy outcomes, including clinical pregnancy and live birth, were similar (Table 2)

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.**

However, the chance of obtaining at least one usable blastocyst was comparable, with most patients able to have at least one usable blastocyst for transfer and with similar live birth outcomes.

Therefore, **donor oocyte banks should consider including these patients in their blastocyst guarantee programs.**

REFERENCES

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