EXPANDING EXTENDED SEARCH TO REDUCE EXCISION:
An analysis of Extended Sperm Search and Microfreeze (ESSM) outcomes in Assisted Reproductive Technology (ART)

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BACKGROUND

- Male factor accounts for 20-30% of infertility cases but can contribute to 50% of cases overall[1].
- ESSM is a non-invasive alternative that uses laboratory techniques to identify small numbers of sperm in ejaculate to avoid potential side effects of invasive procedures such as microtesticular sperm extraction (TESE)
- While ESSM may be equivalent to TESE in terms of ART outcomes, the finding of sperm can be technically challenging, require highly trained personnel, and is excessively time consuming
- Utilizing ESSM poses a challenge for lab management in high volume centers
- Therefore, many utilize an option for both fresh and frozen ESSM samples, to ensure there is viable sperm on day of oocyte retrieval and to aid with coordination of clinical care
- There is no consensus on the efficacy of fresh versus previous frozen ejaculated sperm for patients who undergo ESSM

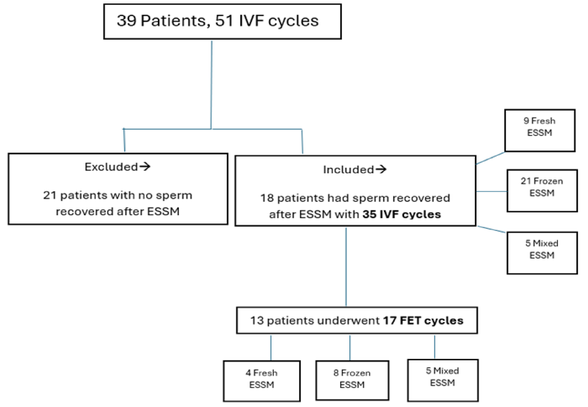
OBJECTIVE

1) To describe the overall cohort of patients with sperm found on ESSM at our center
2) To evaluate our ESSM ART outcomes with a specific focus on fresh versus frozen ESSM

MATERIALS & METHODS

- Retrospective cohort study, (NYU IRB #13-00389)
- Subjects: Male patients who underwent ESSM where sperm was recovered, at a single university-affiliated center from 1/2022-8/2023.
- Inclusion criteria: (1) diagnosis of severe male factor (2) referred to ESSM from our center (3) sperm were found on ESSM.
- Exclusion criteria: no sperm found on ESSM
- Primary Outcome: fertilization rate defined as Number 2pronuclear zygotes/Number of oocytes for intracytoplasmic sperm injection-ICSI
- Secondary Outcomes:
  - blastocyst formation rate (#totalblastocysts/#2PN)
  - euploidy rate (#euploids/#blasts biopsied)
  - embryo transfer outcomes
- Statistical analysis: Kruskal Wallace with an alpha error of 0.05 as significant

FIGURE 1: FLOW DIAGRAM OF INCLUDED PATIENTS



Diagnoses for Male Factor for 18 Included Patients:

- 2 patients with a history of chemotherapy: 1 with stage 1B seminoma s/p left radial orchiectomy with azoospermia, another with chemotherapy induced cryptospermia
- 13 patients had idiopathic cryptospermia or non-obstructive azoospermia
- 1 patient each with a history of spina bifida affecting the urogenital system
- 1 with severe narcotic abuse following history of spinal surgery,
- 1 with a genetic male factor from a Robertsonian translocation t(13,14) with primary ciliary dyskinesia.

RESULTS: OUTCOMES OF ESSM COHORT

Overall ART Outcomes:

- 18 patients had sperm recovered→34 IVF cycles-→ 17 ETs
- Median number of sperm recovered: 16 (IQR 12.3-48); egg age: 36y (IQR 31-39.3); sperm age: 42.5y (IQR 33-41.5).
- Median fertilization rate: 63.0% (IQR 29.6%-71.4%); blast formation rate: 47.0% (IQR 23.0-60.0%): euploidy rate: 33.3% (IQR 18.8%-71.4%)
- Livebirth rate: 53% (9/17); negative pregnancy rate: 29.5% (5/17); biochemical pregnancy rate: 6% (1/17); SAB: 6% (2/17)

CONCLUSIONS

1) ESSM is an emerging option for patients with severe MF infertility with an overall LBR rate of 53% which is comparable to the national euploid livebirth rate of 56.3% for patients 35-37yo.[2]

2) Though this study showed better fertilization with fresh sperm, the blast formation rate, euploidy, and live birth rate did not differ; thus the difference of fresh versus frozen ESSM is yet to be determined

TABLE 1: OUTCOMES BY FRESH VERSUS FROZEN SPERM

	Fresh (n=9)	Frozen (n=21)	Mixed (n=5)	P value
Egg source Age (years)	34.0 (30-36.5)	37.0 (31.5-40.0)	36 (31.5-39.5)	0.45
Sperm source Age (years)	39.0 (33.0-43.0)	36.0 (33.0-40.0)	37.5 (32.0-42.3)	0.97
Number of Motile Sperm	26.0 (16.0-55.0)	20.0 (7.5-32.75)	49.0 (5-49.0)	0.47
Fertilization Rate (%)	0.71 (0.63-0.82)	0.4 (0.12-0.48)	0.5 (0.33-0.65)	**<0.01**
Blast Formation Rate (%)	0.5 (0.36-0.60)	0.33 (0-0.62)	0.53 (0.45-0.7)	0.27
Euploid Rate (%)	0.5 (0.38-0.64)	0.41 (0-1.00)	0.6 (0.3-0.91)	0.72

Table 1. Data presented as Median and IQR

RESULTS: SUBGROUP ANALYSIS OF ART OUTCOMES BY ESSM TYPE

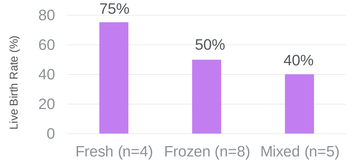
Table 1:

- Demographics including oocyte age, sperm age, and number of sperm recovered were not different between the groups (p=0.45, p=0.97, p=0.47, respectively)
- Median fertilization rate between the groups was different (p<0.01)
  - Fresh: 71.0% (IQR 63.0-81.0%)
  - Frozen: 40% (IQR 10%-48%)
  - Mixed: 50% (IQR 0-50%)
- No difference in blast formation rate and euploidy rate between the groups, p=0.27, p=0.72 respectively)

Figure 2:

- the live birth rate for fresh ESSM who underwent transfer (n=4) was 75% (3/4), for frozen (n=8) was 50% (4/8), and for mixed (n=5) was 40% (2/5), p=0.92
- Of the two live births in mixed cohort, one was ultimately with frozen and one with fresh

FIGURE 2: LIVE BIRTH RATES PER TYPE OF ESSM SPERM



There was **no difference in overall LBR between fresh, frozen, and mixed ESSM**

(p = 0.92)

REFERENCES

1) Miller N, Biron-Shental T, Pasternak Y, Belenky M, Shefi S, Itsykson P, Berkovitz A. "Fertility outcomes after extended searches for ejaculated spermatozoa in men with virtual azoospermia"
2) www.SART.org: National Summary Report

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