LISTER FERTILITY CLINIC
part of HCAHealthcare UK

The impact of microfluidic sperm selection on assisted reproductive outcomes

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Introduction

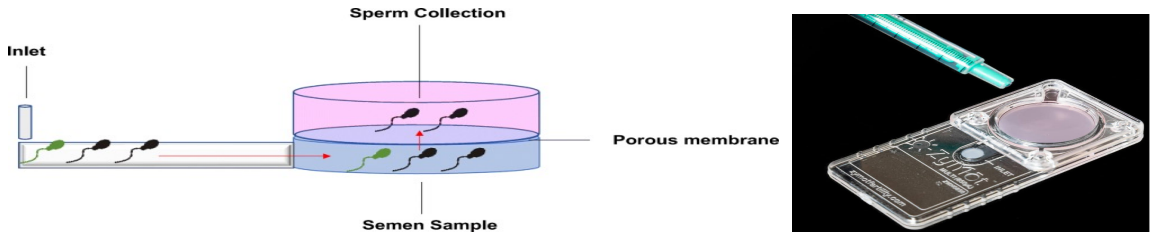
Sperm selection techniques have developed to improve Assisted Reproductive Technology (ART) outcomes in male infertility. The most recent methods for preparing and selecting sperm involve micro-fluidic chamber sperm selection including ZyMot (DxNow, Maryland).

Methods

We performed a retrospective case control study including all patients undergoing ICSI cycles during the period from 2021 through 2023 at The Lister Clinic (London, UK). Patients were followed at our center for at least 1 year until pregnancy outcome was known or delivery of a live infant. The case group all used ZyMot for sperm selection. All patients without a live birth in an IVF cycle were eligible for the subsequent cycle.

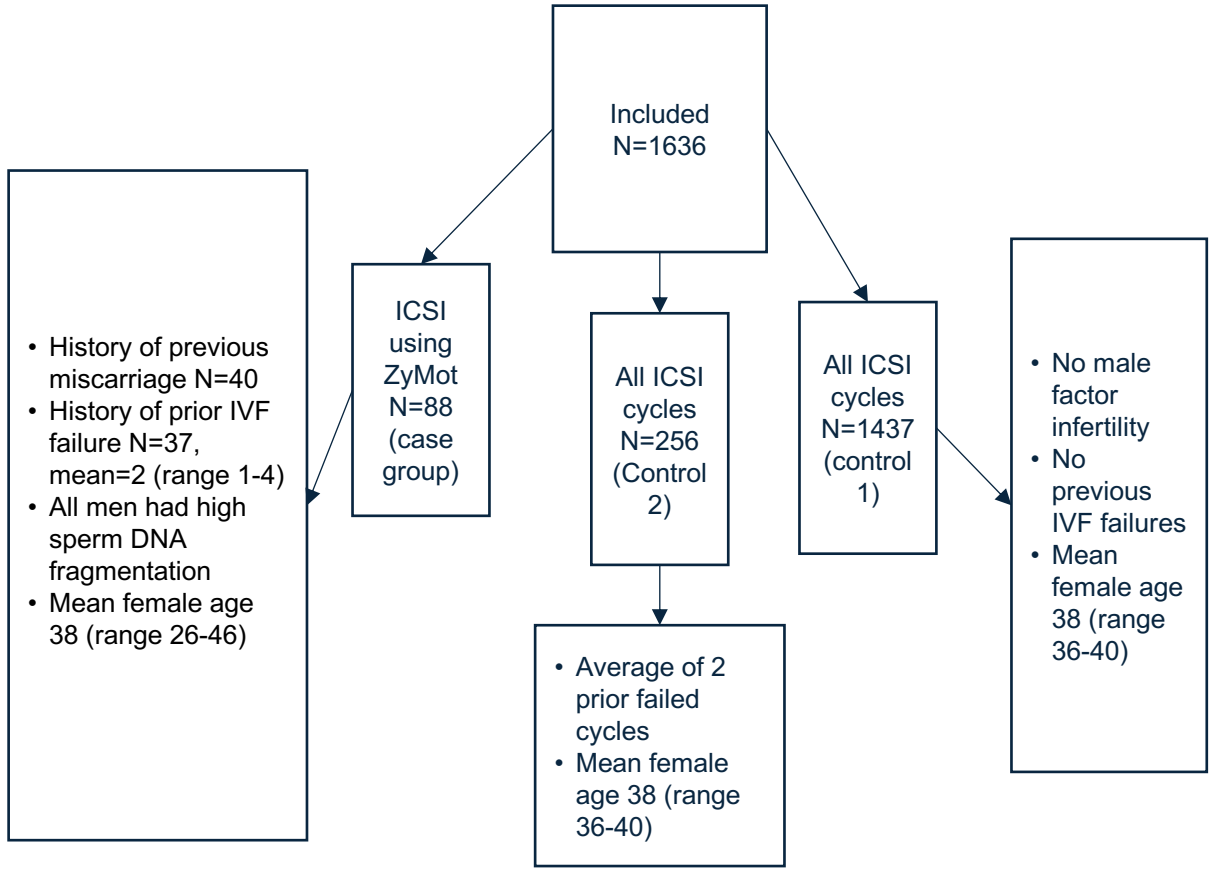
Mechanism

Microfluidic devices have been developed to select sperm typically through motility-based behavioral mechanisms, thereby preventing the oxidative stress and DNA fragmentation induced by centrifugation. Raw semen samples are loaded into the bottom chamber of the microfluidic device through an inlet and incubated. Sperm with the highest progressive motility and superior chromatin integrity are able to pass through the porous membrane into the upper chamber, where they are collected after incubation.



Results

• Characteristics of the patients



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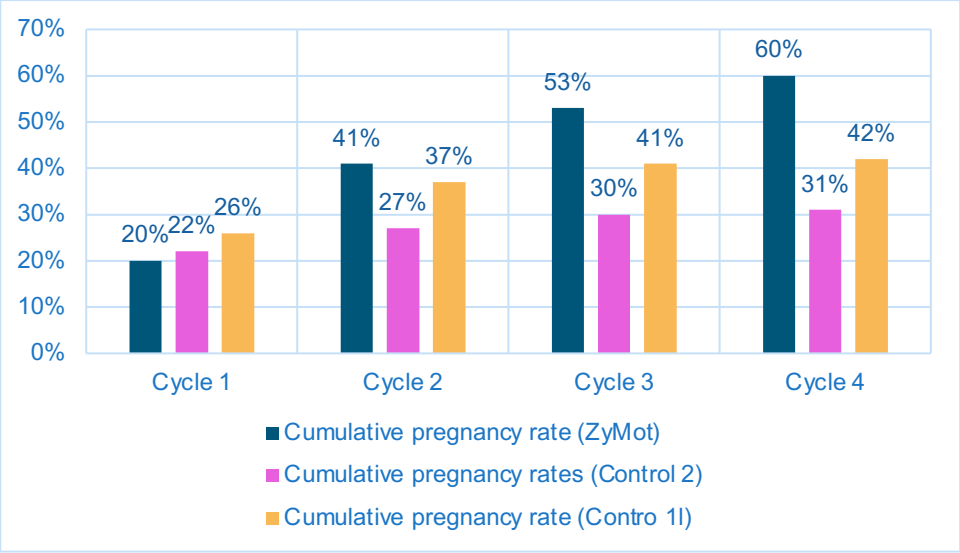
Results

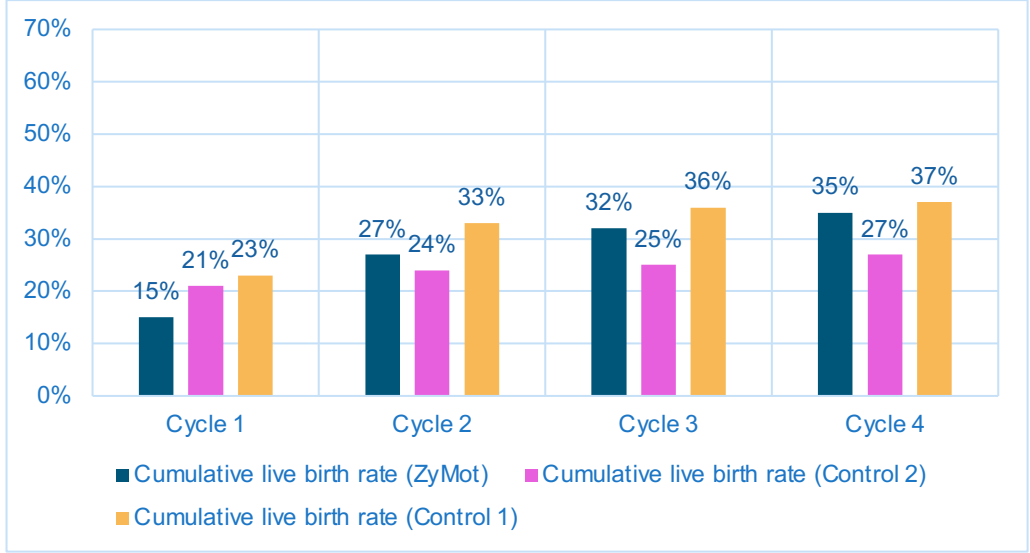
- Sperm DNA fragmentation levels were assessed using the Comet assay before and after ZyMot processing (N=34), and live birth, pregnancy and embryo transfer rates can be seen pre-ZyMot and post-ZyMot after each cycle.

	Pre ZyMot	Post ZyMot	P value
ACS	43	36	<0.01
LCS	20	43	<0.01
HCS	29	16	<0.01

	Pre-ZyMot	Cycle 1	Cycle 2	Cycle 3	Cycle 4
Live birth rate	10%	15%	22%	19%	44%
Pregnancy rate	1%	20%	36%	52%	66%
Embryo transfer rate	23%	54%	80%	76%	89%

- Cumulative pregnancy rates post ZyMot were higher than both groups from cycle 2,3, and 4. For cycle 1 there was no significant difference in both cumulative live birth and pregnancy rates. Cumulative live birth rates for the ZyMot group were higher than control 2 from cycle 2,3, and 4. (chi square test , p<o.o5).





Conclusion

The ZyMot group showed increased cumulative pregnancy rates compared to the control groups from the 2nd cycle onwards, despite the history of high DNA fragmentation, recurrent miscarriage and previous IVF failure. Microfluidic techniques like ZyMot show potential for improving pregnancy rates in couples with high sperm DNA fragmentation and improving pregnancy outcomes for couples with previous IVF failures.

Contact

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