

Elevated Sperm DNA Fragmentation Does Not Predict Recurrent ICSI Failure

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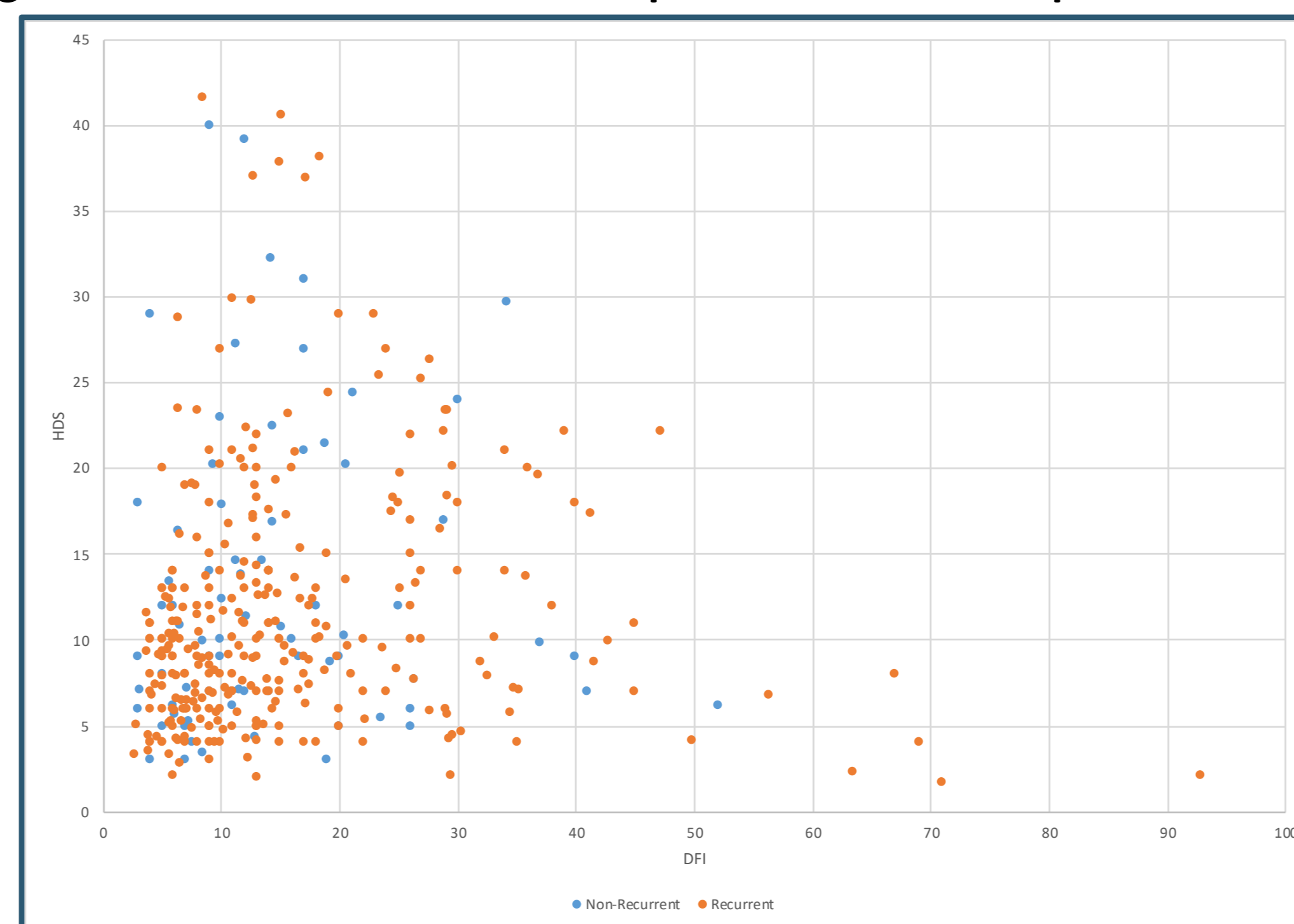
INTRODUCTION

- A WHO study published in 2012 estimated that 1 in every 4 couples in developing countries experience infertility.¹
- For many couples who experience infertility trying to conceive naturally, many turn to fertility specialists who are able to give hope with the use of assisted reproductive techniques (ART); including traditional in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), or frozen embryo transfers (FET).
- Live birth rates from 2004 to 2013 following ART were below 30% in the U.S., which has been reported to be one of the most successful countries²
- **OBJECTIVE:** To determine whether sperm DNA fragmentation (DFI%) and High DNA Stainability (HDS%) evaluated by sperm chromatin structure assay (SCSA) predicts recurrent implantation failure (RIF), pregnancy rate, or live birth rates.

METHODS

- We performed a retrospective study looking at couples who underwent ICSI or FET cycles between January 2009 through December 2018
- Using the Society for Assisted Reproductive Technology database we identified all couples that had undergone at least 2 cycles during this time frame at a large reproductive medicine center in Miami, Florida.
- Couples were excluded if they previously underwent ICSI, cycle canceled for any reason, as well as those using donor eggs.

A. Figure – DFI and HDS Levels in Couples With RIF vs Couples Without RIF



B. Table – Multivariate Analysis Assessing DFI

	Recurrent ICSI failure n = 390 couples		
	OR	95% CI	p-value
DFI (%) continues variable	1.01	0.98 - 1.04	0.414
DFI (%) categorized			
DFI ≤ 15%	1		
DFI 15.1-20%	0.66	0.30 - 1.42	0.285
DFI 20.1-25%	0.69	0.23 - 2.06	0.503
DFI 25.1-30%	1.31	0.45 - 3.79	0.620
DFI ≥ 30.1%	1.40	0.46 - 4.30	0.557

*Controlling for Total Motile Sperm Count, Male Age, Female Age, Smoking Use, Varicocele, Female Body Mass Index, HDS, and Female Age

RESULTS

- A total of 393 couples underwent 1202 cycles with a median pregnancy success and live birth rate of 36.9% and 20.6%, respectively. (A)
- DFI and HDS were not predictive for achieving a pregnancy ($p=0.76$ and $p=0.96$, respectively), nor was DFI predictive of spontaneous abortion ($p=0.92$). However, HDS was found to be predictive of spontaneous abortion, with higher percentages of HDS seen in live births vs. spontaneous abortion (12.4% vs 9.3%, $p=0.003$).
- DFI and HDS were not associated with RIF ($p=0.43$, $p=0.14$, respectively), nor were they predictive of IVF success, defined as clinical pregnancy, in those with normal values of DFI and HDS when controlling for female age. (B)

CONCLUSIONS

- In our study, we were unable to find an association between an increased DFI or HDS in couples with RIF - suggesting that sperm DFI does not predict recurrent ICSI failure
- This continues to highlight the need for further studies in this area to truly understand the utility and clinical importance of assessing sperm DNA fragmentation.

REFERENCES

1. National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. PLoS Med 2012
2. Society for Assisted Reproductive Technology. Assisted Reproductive Technology National Summary Report. In, 2016