

ASSESSING THE IMPACT OF SPERM DNA FRAGMENTATION INDEX FROM SPERM CHROMATIN STRUCTURE ASSAY TESTING ON IN-VITRO FERTILIZATION OUTCOMES



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BACKGROUND

- Routine semen analyses provide helpful metrics for assessing male fertility but do not evaluate all aspects of sperm quality
- The **Sperm Chromatin Structure Assay (SCSA)** is an adjuvant testing option for quantification of **sperm DNA Fragmentation Index (DFI)**, which is defined as % of sperm containing measurable DNA damage
- Although elevated DFI has been associated with decreased male fertility potential, its clinical application in assisted reproductive technology remains controversial¹**

OBJECTIVE

- To assess the impact of DFI measured by SCSA testing on IVF outcomes**

MATERIALS AND METHODS

Study Design

- Retrospective cohort study** (NYU IRB#13-00389) of couples who underwent an IVF cycle within 75 days of SCSA testing at a university-affiliated fertility center from 2016 to 2025
 - If a couple underwent 2 or more IVF cycles, only the closest cycle to the date of SCSA testing was included

Primary Outcome

- Live birth rate (LBR) per IVF cycle**, classified by DFI into **HIGH (DFI ≥ 25%)** vs **LOW (DFI < 25%)** groups

Secondary Outcomes

- Fertilization rate, blastulation rate, euploidy rate, cycle cancellation rate and embryo transfer rate per IVF cycle

Statistical Analysis

- The two-sample t, Mann-Whitney U, and Fisher's exact tests were performed with a p-value less than 0.05 considered significant

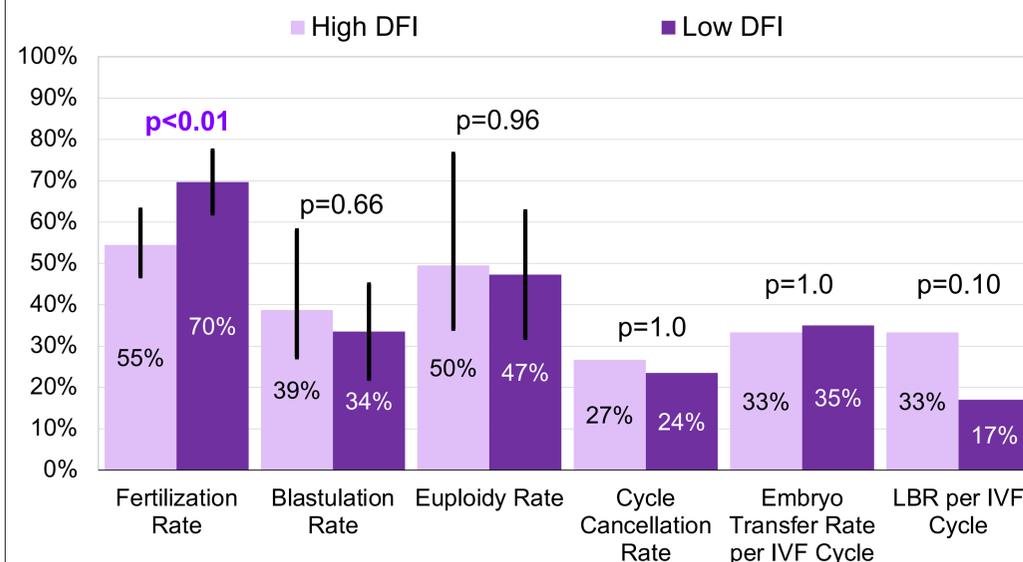
TABLE AND FIGURE

Table 1: Patient and Cycle Characteristics

	HIGH DFI	LOW DFI	P-value
Male age	39 years (R: 32-67)	36 years (R: 31-45)	0.25
Female age	36 years (R: 32-41)	34 years (R: 28-41)	<0.03
Median DFI	30.0% (R: 25.0-51.8)	13.4% (R: 4.0-24.7)	<0.01
Median high DNA stainability score (HDS)	15.0% (R: 3.9-37.0)	9.9% (R: 3.0-35.0)	<0.03
Median time from SCSA to IVF	36 days (R: 2-63)	31 days (R: 5-72)	0.99
Total motile count	8.3 million sperm (R: 0.01-142.1)	55.9 million sperm (R: 4.2-420.0)	<0.01
ICSI performed	80% (n=12/15)	67.6% (n=23/24)	0.50
Mean total oocytes	13.5 oocytes (R: 5-40)	18.9 oocytes (R: 1-45)	0.77
Mean metaphase II oocytes (M2s)	11.0 M2s (R: 2-32)	14.8 M2s (R: 1-35)	0.11

R = Range

Figure 1: IVF Outcomes



RESULTS

- 49 out of 110 (44.5%) patients who underwent SCSA testing were included in the analysis, which were classified as:
 - 30.6% (n=15/49) HIGH DFI
 - 69.4% (n=34/49) LOW DFI
- Table 1 summarizes Patient and Cycle Characteristics**
 - Female partner age, median DFI, median HDS and total motile count were statistically different between groups
- Indication for SCSA testing was most frequently a prior suboptimal IVF outcome in the LOW DFI group (26.7% (n=4/15) HIGH vs 61.8% (n=21/34) LOW, p<0.04)
 - Other testing indications were similar between groups including a history of varicocele, cancer diagnosis and urogenital infection
- Figure 1 displays IVF Outcomes**
 - Fertilization rate was statistically different between groups
 - The LBR per IVF cycle (**primary outcome**) was statistically similar between groups

CONCLUSIONS

- While the fertilization rate was statistically higher in the LOW DFI group, there were no differences in blastulation and euploidy rates
- The embryo transfer rate per IVF cycle and LBR per IVF cycle were similar regardless of DFI group**
- Larger studies are still needed to determine the clinical utility of SCSA as it pertains to IVF outcomes

REFERENCE

- Agarwal A, Farkouh A, Saleh R, et al; Global Andrology Forum. Controversy and Consensus on Indications for Sperm DNA Fragmentation Testing in Male Infertility: A Global Survey, Current Guidelines, and Expert Recommendations. World J Mens Health. 2023 Jul;41(3):575-602.

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