Texas Medical Association
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TexMed 2017 Clinical Abstract

Please complete all of the following sections and include supporting charts and graphs in this document. Submit a total of two documents - this document and the Biographical Data and Disclosure Form to posters@texmed.org by midnight March 17, 2017.

Procedure and Selection Criteria

- Submissions not directly related to quality improvement or research may be accepted and should follow the standardized format outlined below. Content should enhance knowledge in the field of clinical care and be relevant to a given patient population.

PROJECT NAME: Cost-effectiveness of Sperm Fluorescence in situ Hybridization Testing for Infertile Men with Suspected Sperm Aneuploidy

Institution or Practice Name: Baylor College of Medicine, Houston, TX; Scott Department of Urology, Baylor College of Medicine, Houston, TX

Setting of Care: Academic Medical Center

Primary Author: Zachary J Solomon

Other Members of Project Team: Matthew F. Cherches, Kristin F. Pascoe, Sohum Shah, Taylor P. Kohn, Alexander W. Pastuszak, Dolores J. Lamb, Larry I. Lipshultz**.**

Is the Primary Author, Secondary Author or Member of Project Team a TMA member (required)?

☒ Yes ☐ No

Please provide name(s) and their role in the project:
TMA Member Name: Zachary Solomon – Primary Author

TexMed Poster Session Specialty Subject Area: Please check if these apply.

☐ **Enhanced Perioperative Recovery**

☐ **Disaster Medicine and Emergency Preparedness**

Clinical

Background (15 points max): *Describe the purpose for sharing the content. What caused this subject matter to be approached? Why is this content important to share? What is the potential impact if this content is not shared?*

Men with recurrent spontaneous abortions (SAB) or implantation failures (IF) may have abnormal sperm aneuploidy which can be diagnosed via fluorescence in situ hybridization (FISH) testing. Couples with men having abnormal sperm FISH testing are often counseled to undergo in vitro fertilization (IVF) with pre-implantation genetic screening (PGS), yet the cost-effectiveness of FISH testing in the context of available genetic testing of the embryo remains unclear. Here we examine the cost effectiveness of sperm FISH testing in the context of assisted reproduction.

Intended Stakeholders (15 points max): *Identify those individuals, organizations, or interest groups that could be potentially impacted by this information or benefit by obtaining this information.*

Our research is of benefit to men undergoing infertility workups and to the clinicians managing them. Assisted reproduction is an expensive endeavor, and our results lend weight to the ultimate cost effectiveness of beginning with the most expensive, yet productive, modality of fertility intervention for men with sperm aneuploidy.

Description of Accomplished Work (25 points max): *Provide an overview of the work that was accomplished, including any specific methods, tools or techniques. Also, include any milestones or key accomplishments. Note charts, graphs and tables here and send as addendum with abstract form.*

Men who had sperm FISH testing for recurrent SAB or IF were called to document subsequent pregnancy attempts. We included 99 men who underwent FISH testing for sperm aneuploidy with 334 attempted pregnancies (pregnancies obtained through natural conception and all assisted reproductive technique cycles), and 11 men who had a FISH order placed, but did not undergo FISH testing with 60 attempted pregnancies. Men were grouped by normal FISH, abnormal FISH, and not tested for FISH, and outcomes of pregnancies conceived by natural intercourse, IVF, intracytoplasmic sperm injection (ICSI), and pre-implantation genetic screening (PGS) after IVF were assessed. Recently published estimates were used to assign costs: FISH $1000, IVF $12,400, ICSI added $1544 to IVF, and PGS added $3550 to IVF. The cost-effectiveness for each category and reproductive method, as well as the overall cost of performing or not performing FISH prior to assisted reproduction, was determined. Please see addendum below for data.

Timeframe and Budget (20 points max): *Provide the start and end dates for the work along with any financial implications that were incurred due to the work accomplished. Note charts, graphs and tables here and send as addendum with abstract form.'*

All telephone surveys were completed by clinicians between May and November 2016. Patients consented to participate in the IRB-approved study. Funding for this project was provided by Male Reproductive Health Research (MRHR to DJL) Career Development Physician-Scientist Award (Grant #HD073917-01) from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Program.

Intended Use (25 points max): *Describe how this information could be used moving forward to impact patient care.*
PGS after IVF is substantially more cost-effective than IVF alone or ICSI with IVF for men with possible sperm aneuploidy. Sperm FISH testing results in higher costs without substantial improvement in outcomes. Thus, couples utilizing assisted reproductive techniques should consider proceeding directly to PGS without undergoing sperm FISH testing.

ADDENDUM

Sperm Aneuploidy Testing	Reproductive Method	Successes	Failures	Total	Success rate	Failure rate	Cost	Cost per pregnancy
No FISH	Natural	5	9	14	0.36	0.64	$0.00	$0.00
Normal FISH	Natural	2	3	5	0.40	0.60	$1,000.00	$2,500.00
Abnormal FISH	Natural	14	113	127	0.11	0.89	$1,000.00	$9,071.43
Normal FISH	PGS	3	0	3	1.00	0.00	$16,950.00	$16,950.00
No FISH	PGS	6	3	9	0.67	0.33	$15,950.00	$23,925.00
Abnormal FISH	PGS	13	10	23	0.57	0.43	$16,950.00	$29,988.46
No FISH	IVF	5	32	37	0.14	0.86	$12,400.00	$91,760.00
Abnormal FISH	IVF	14	117	131	0.11	0.89	$13,400.00	$125,385.71
Normal FISH	IVF	1	9	10	0.10	0.90	$13,400.00	$134,000.00
Abnormal FISH	ICSI	4	23	27	0.15	0.85	$14,944.00	$100,872.00
Normal FISH	ICSI	0	8	8	0.00	1.00	$14,944.00	∞
No FISH	ICSI	0	0	0	-	-	$13,944.00	N/A

Table 1a: Successful outcome = live birth. Failure = spontaneous abortion and implantation failure. Success rate = live births / total pregnancy attempts. Assigned costs: FISH $1000, IVF $12400, ICSI $12400 + $1544, PGS $12400 + $3550. Cost-effectiveness (cost per pregnancy) = cost / success rate.

Sperm Aneuploidy Testing	Reproductive Method	Failure Rate	Cost	Cost * Failure Rate	Summed Cost for Test	Likelihood of FISH outcome in our sample	Summed Cost, Weight by Likelihood	Total Cost
Normal FISH	Natural	0.60	$1,000.00	$600.00	$13,903.65	7/99 = 0.071	$983.09	$19,909.56
	PGS	0.00	$16,950.00	$0.00				
	IVF & ICSI	0.94	$14,086.22	$13,303.65				
Abnormal FISH	Natural	0.89	$1,000.00	$889.76	$20,366.54	92/99 = 0.929	$18,926.48	
	PGS	0.43	$16,950.00	$7,369.57				
	IVF & ICSI	0.89	$13,663.85	$12,107.21				
No FISH	Natural	0.64	$0.00	$0.00	$16,040.99	N/A	$16,040.99	$16,040.99
	PGS	0.33	$15,950.00	$5,316.67				
	IVF & ICSI	0.86	$12,400.00	$10,724.32				

Table 1b: Summed cost = failure rate multiplied by cost, summed within each category of sperm aneuploidy testing, then weighted by prevalence of FISH test result in our sample. IVF and ICSI were combined; total cost for IVF/ICSI group was weighted by pregnancy attempts with each method.