Fresh and frozen patient cycles by degree of patient location accessibility and SD match

	Low Access (n) %	Moderate Access (n) %	High Access (n) %	Total (n) %
High SD match	(2) <1%	(19) 1%	(617) 39%	(638) 40%
Moderate SD match	(2) <1%	(179) 11%	(596) 38%	(777) 49%
Low SD match	(20) 1%	(84) 5%	(69) 4%	(173) 11%
Total	(24) 2%	(282) 18%	(1282) 81%	(1588) 100%

CONCLUSION: Combining accessibility results with sociodemographic mapping provide valuable insights into the accessibility of IVF services to a state's population and the degree to which demand for IVF care is being met. Geospatial techniques are a promising tool for IVF providers considering how best to expand access to care.

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AFRICAN AMERICAN (AA) RECIPIENTS OF DONOR OOCYTES HAVE LOWER EMBRYO IMPLANTATION RATES AS COMPARED TO MATCHED CAUCASIAN CONTROLS. L. C. Grossman, S. M. DeVore, A. J. Adeleye, S. K. Nurudeen, B. J. Rudick, M. Thornton, M. V. Sauer. Obstetrics and Gynecology, Columbia University Medical Center, New York, NY.

OBJECTIVE: Studies suggest that AA women suffer worse in vitro fertilization (IVF) and pregnancy outcomes compared to Caucasians, with differences often attributed to their increased incidence of uterine pathology. We aimed to control for known confounders by comparing outcomes in donor IVF (dIVF) recipients to determine the specific impact race might have on implantation.

DESIGN: Case-control study.

MATERIALS AND METHODS: AA recipients were matched with Caucasian recipients (controls) with similar fibroid and uterine surgery histories cycling during similar time periods. After chart review, 71 AA women undergoing 126 recipient fresh and frozen embryo transfer (ET) cycles were matched with 63 controls and 115 cycles. Histories between AA patients and controls were similar including current fibroids (49 vs. 46%) and history of myomectomy (35 vs. 32%), cesarean section (13 vs. 14%), intrauterine adhesions (7 vs. 7%), and hysteroscopy (27 vs. 26%). As more AA women had complicated histories, 5 controls with similar histories were matched more than once after review of 142 control charts. Demographics, history, cycle information, implantation, and pregnancy outcomes were analyzed. Comparisons were made using t-tests and odds ratios where appropriate.

RESULTS: Both groups had similar demographics and histories. AA women had a significantly higher mean body mass index (BMI) (26±4 vs. 23±3; P<0.0001), however only 11 AA and 2 Caucasian women met criteria for obesity (BMI>30). DIVF cycle outcomes were similar, however controls had a significantly higher number of normally fertilized oocytes (14±5 vs. 12±7; P<0.008) and fertilization rates (76±14% vs. 68±19%; P<0.003) despite similar rates of intracytoplasmic sperm injection. Controls also had significantly higher implantation rates. Live birth rates appeared higher in controls, but failed to reach significance. There was no significant change in outcomes when obese women were excluded.

Comparison of outcomes

Rate per ET	AA	Caucasian	Odds Ratio	P value
Implantation	30%	35%	-	*0.004*
Clinical Pregnancy	46%	52%	0.8	0.413
Live Birth	32%	44%	0.6	0.052

CONCLUSION: After controlling for history of uterine pathology, AA women appear to have lower implantation rates and may have lower live birth rates compared to Caucasian women undergoing oocyte donation. AA women also had decreased number of donor oocytes and fertilization rates. Further studies matching AA women to controls undergoing autologous IVF cycles would further elucidate these findings.

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REPLETE VITAMIN D LEVELS ARE ASSOCIATED WITH HIGHER PREGNANCY RATES AND INCREASED NUMBER OF LIVE BIRTHS IN AUTOLOGOUS IVF CYCLES. K. N. Fru,[a] T. Segal,[b] J. M. Cox,[a] S. L. Mumford,[a] F. I. Sharara,[c] J. H. Segars.[a] [a]NICHD, NIH, Bethesda, MD; [b]NS-LIJ HS, Manhasset, NY; [c]VCRM, Reston, VA.

OBJECTIVE: Prior studies described reduced live birth rates in Whites but not Asians with decreased vitamin D levels. Our study examined this relationship in a racially diverse population.

DESIGN: Retrospective cohort study.

MATERIALS AND METHODS: Autologous IVF cycles at a private US ART center (1/2011-12/2013) were reviewed for pre-cycle Vit D(deficient <20, insufficient 20-30, replete >30ng/ml), positive hCG, chemical loss, spontaneous and missed abortions (SAB, MAB) and live births. Repeated measures ANOVA, Fisher's exact test, and generalized linear models were used to evaluate associations.

RESULTS: 124 cycles (n=102 women) were included in this analysis. Baseline characteristics of age, body mass index, parity and stimulation protocol were similar between groups. Women with replete Vit D levels had 67% positive hCG vs 33% in deficient women (p=0.03). Similar proportions of live births were achieved within groups (5/6 or 83% in deficient, 15/24 or 62% in insufficient and 25/37 or 68% in replete). Overall, 28% of deficient women had live births vs 43% of the replete women (p=0.31). No differences by race were found in IVF outcome by Vit D category. However, in all non-replete women (Vit D levels < 30 ng/ml) risk ratios (RR) for positive hCG were 0.78 (95% Confidence Interval 0.61, 0.99, p=0.04) adjusted for age and race, and among Asian women the unadjusted RR was 0.47 (95% CI 0.25, 0.90, p=0.02). Of note, Vit D deficient women required less days of stimulation (P=0.03), had higher peak E2 levels (P=0.0007), and tended to require less gonadotropins (P=0.08) than the insufficient and replete groups. Mean AMH by Vit D category was 2.89 vs 2.24 vs 2.0 in deficient, insufficient and replete women respectively (p=0.31).

		Vitamin D Levels, ng/ml	Vitamin D Status, N (%)		
	# IVF Cycles	Mean (95% Confidence Interval)	Deficient <20 ng/ml	Insufficient 20-30 ng/ml	Replete >30 ng/ml
Live birth	45	32.9 (28.6, 37.1)	5 (28)	15 (32)	25 (43)
Chemical loss	5	29.8 (17.0, 42.5)	0 (0)	2 (4)	3 (5)
MAB	9	32.9 (23.4, 42.4)	1 (5)	4(8)	4 (7)
SAB	8	37.9 (27.8, 48.0)	0 (0)	3 (6)	5 (9)
NP	57	30.3 (26.5, 34.1)	12 (67)	24 (50)	21 (36)

*Includes 9 patients with ongoing pregnancy

CONCLUSION: Higher Vit D levels correlated with an increased likelihood of positive hCG in a racially diverse population. Given similar rates of pregnancy loss, the overall proportion of live births was highest in the Vit D replete group. The study is ongoing.

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OXIDATIVE STRESS

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SERUM AND PERITONEAL FLUID LEVELS OF ISCHEMIA MODIFIED ALBUMIN IN ENDOMETRIOSIS. K. Gok,[a] Y. Tasci,[a] G. S. Caglar,[b] B. Dilbaz,[a] S. Demirtas,[b] S. Ozdemir.[b] [a]etlik Zübeyde Hanim Womens Health Research Hosp, Ankara, Turkey; [b]Ufuk University Faculty of Medicine, Ankara, Turkey.

OBJECTIVE: Recently, the role of oxidative stress in development and progression of endometriosis has been reported (1). Ischemia modified albumin (IMA) is a marker of protein oxidation and very limited number of studies has evaluated the role of IMA in endometriosis. This study was designed to evaluate the serum and peritoneal IMA levels in moderate/severe endometriosis as a marker of oxidative stress.

DESIGN: Prospective controlled clinical trial.

MATERIALS AND METHODS: The study group consisted of 35 cases with dysmenorrhea, dyspareunia and/or pelvic pain and an ovarian mass compatible with endometrioma in transvaginal ultrasonography. The diagnosis of endometriosis of the study group was confirmed histopathologically by laparoscopy. The control group was cases without endometriosis that underwent laparoscopy for tubal sterilization. The serum levels of IMA were measured spectrophotometrically by colorimetric method with complex of albumin non-binding cobalt and dithioerthreitol.

RESULTS: The mean age of the participants were 33 ±5.6 years. The median serum IMA levels of the study and control groups were 0.35 and 0.33 abs/u, respectively (p=0.553). The levels of peritoneal fluid IMA levels were significantly higher than control group (0.52 vs 0.44 abs/u in study and control groups, respectively; p=0.044). Regarding the symptomatology, in endometriosis cases with dysmenorrhea peritoneal fluid IMA levels were much higher than cases without dysmenorrhea (p=0.018).

CONCLUSION: The increased levels of IMA in peritoneal fluid of endometriosis support the possible role of oxidative stress in endometriosis. With this study, peritoneal fluid IMA levels are initially documented in endometriosis cases.

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FOLLICULAR FLUID TOTAL ANTIOXIDANT CAPACITY AND ISCHEMIA MODIFIED ALBUMIN LEVELS IN POLYCYSTIC OVARY SYNDROME. I. N. B. Duzguner,[a] Y. Tasci,[a] G. S. Caglar,[b] B. Dilbaz,[a] S. Demirtas,[b] I. Kaplanoglu,[a] S. Duzguner.[a] [a]Etlik Zubeyde Hanim Womens Health Research Hospital, Ankara, Turkey; [b]Ufuk University, Faculty of Medicine, Ankara, Turkey.

OBJECTIVE: This study is designed to evaluate Ischemia modified albumin (IMA) and total antioxidant capacity (TAC) levels in follicular fluid of polycystic ovary syndrome (PCOS) cases undergoing IVF as a marker of oxidative stress.

DESIGN: Prospective controlled clinical trial.

MATERIALS AND METHODS: The study group consisted of PCOS cases (n=30) (Rotterdam criteria) undergoing IVF cycles.The control group was age-matched normoovulatuar, normogonadotropic IVF cases (n=30).The age of the participants ranged from 23 to 39 years.The controlled ovaryan hyperstimulation was performed by long protocol down regulation and recombinant FSH stimulation.Aspirated follicular fluid containing mature oocytes were analyzed for TAC and IMA levels. IMA levels of serum and follicular fluid were measured spectrophotometrically by colorimetric method with complex of albumin non-binding cobalt and dithioerthreitol. TAC levels of serum and follicular fluid were measured spectrophotometrically by Randox kit.Fertilization, embryo quality, endometrial assessment and final pregnancy outcome were assessed.

RESULTS: No statistically significant difference was found between the groups when compared for mean age, body mass index, duration of infertility and the mean number of previous IVF cycles (p>0.05).The cycle outcome parameters were also similar (total gonadotropin dose, duration of induction, number of oocytes retrieved, number of MII oocytes, number of transferred embryos, number of grade 1 embryos, implantation rate and clinical pregnancy rate) (p>0.05). Although not statistically significant, follicular fluid IMA and TAC levels were higher in PCOS group.Follicullar fluid IMA levels were positively correlated with embryo grading (r=0.328; p=0.030).The sensitivity, specifity, positive and negative predictive values of the best cutoff value of follicular fluid IMA (1.475 abs/u) for the prediction of grade 1 embryo development were 77%, 54%, 73% and 60%, respectively (AUC: 0.669; p=0.032).In PCOS cases with TAC between ≤1.299 mmol/L and ≥1.3 mmol/L, the fertilization rates, the number of MII oocytes, embryo grading and follicular fluid IMA levels were significantly different (p<0.05).

CONCLUSION: Follicular fluid IMA can be used as a marker in assessing oxidative stress in PCOS cases undergoing IVF.In addition, follicular fluid TAC and IMA seem to be a good predictor for estimating the quality of the oocyte and the embryo.

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EMBRYONIC METABOLOMIC ANALYSIS UTILIZING NEAR INFRARED (NIR) SPECTROSCOPY TO ANALYZE EMBRYOS IN THE SAME COHORT DOES NOT PREDICT IMPLANTATION RATE: A PROSPECTIVE COHORT STUDY. J. M. Franasiak,[a,b] K. H. Hong,[a,b] M. D. Werner,[a,b] R. T. Scott, Jr.,[a,b] [a]RWJ Medical School, Rutgers University, New Brunswick, NJ; [b]RMA of New Jersey, Basking Ridge, NJ.

OBJECTIVE: NIR metabolomic profiling of culture media has been assessed as a predictive tool for embryonic competence. Early validation studies were able to demonstrate statistical differences in single embryo transfers with known outcomes. These data, while provocative, were greatly limited in that they did not distinguish between embryos in the same cohort–something of paramount importance if NIR is to be used to enhance embryo selection. To address this question we evaluated the range and variability of NIR viability index (VI) results amongst double embryo transfers (DET) with 0%, 50%, and 100% implantation rates.

DESIGN: Prospective cohort study.

MATERIALS AND METHODS: Patient underwent fresh DETs at a single center. Spent culture media was collected and embryos transferred on day 3 and NIR analysis subsequently performed. Data were stratified by implantation rate (0%, 50%, and 100%). NIR analysis yielded a mean VI each stratification statistically compared with an ANOVA test. The F test compared variance amongst the groups and an ROC curve was created for VIs and implantation rates.

RESULTS: Spent media from 180 patients was evaluated and stratified into 0% (n=71), 50% (n=59), and 100% (n=50) implantation rate groups. No difference existed between the mean VIs indicating that NIR did not discriminate between embryos (p=0.9). In fact, the range of VIs for the 100% group was entirely within confidence range of the 0% group. ROC analysis for VIs from the 0% and 100% yielded an AUC of 0.53 indicating no value was predictive of outcome (p=0.26). The greatest variability in VIs was expected in the 50% rate group where one sample came from the embryo which delivered and one from the non-viable embryo. However, the F-test for variance showed that the 0% group had a higher level of variance than the 50% group (p=0.001), further calling into question the discriminatory power of the test.

The viability index does not allow for enhanced embryo selection.

Implantation Rate	Sample Size	Viability Index Score (Mean)	95% CI
0%	71	0.299	-0.76 - 1.36
50%	59	0.496	-0.21 - 1.21
100%	50	0.296	-0.58 - 1.17

CONCLUSION: The VI from NIR metabolome analysis was unable to predict implantation rates for embryos within the same cohort and the range of VIs made the embryos indistinguishable from one another. Although initial studies showed NIR had the ability to distinguish outcomes amongst patients, unless the distinction is made at the embryonic level the ability to enhance selection power does not exist.

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ROLE OF CUMULUS CELLS IN DEFENSE AGAINST REACTIVE OXYGEN SPECIES INSULT IN METAPHASE II MOUSE OOCYTES. H. M. Abu-Soud, S. N. Khan, F. Shaeib, J. Banarjee, M. Thakur, J. Dai, A. Awonuga, G. M. Saed. Obstetrics and Gynecology, Wayne State University, Detroit, MI.

OBJECTIVE: Chronic inflammation in the female genital tract has been associated with poor reproductive outcomes caused by oxidative stress in the form of enhancement of reactive oxygen species (ROS). Specifically, the damage mediated by ROS targets proteins, lipids, and DNA, thus compromising the function and viability of cells including the cumulus oocyte complex (COC). Recently, we have shown that ROS deteriorate oocyte quality by altering the microtubule morphology (MT) and chromosomal alignment (CH).

DESIGN: Basic Science Cell Study.

MATERIALS AND METHODS: In the current work, we extent these studies to investigate the direct effects of increasing concentrations of ROS such as hydrogen peroxide (H2O2), peroxynitrite (ONOO-), hydroxial radical (·OH), and hypochlorous acid (HOCl) on metaphase II mouse oocytes MT and CH with (n=∼540) and without cumulus cells (n=∼540), as well as cumulus cell number and viability. Oocytes were fixed and subjected to indirect immunofluorescence, and deterioration in oocyte quality was assessed by the changes in the MT and CH.

RESULTS: Oocytes with and without surrounding cumulus cells treated with increasing concentrations of all ROS showed decreased quality as a function of concentration as compared to untreated controls. Cumulus cells show protection against H2O2 and ·OH insult at low concentrations, but this protection was lost at higher concentrations (50 μM and above). However, cumulus cells offered no statistically significant protection against