



SERUM VITAMIN D (OHD) LEVELS ARE CORRELATED WITH EMBRYONIC ANEUPLOIDY

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OBJECTIVE: The OHD deficiency epidemic has prompted exploration into many areas of human health and disease. This steroid hormone has receptors throughout the body including the ovary—in particular the granulosa cells. It has been shown that transfer of a euploid blastocyst in a synchronous IVF cycle seems to overcome the detrimental affect of OHD. However, it is possible its insult to reproductive outcomes comes proximal to formation of a euploid blastocyst. The present study investigates the affect of OHD level on embryonic aneuploidy.

DESIGN: Retrospective cohort study

MATERIALS AND METHODS: The study included patients undergoing IVF/PGS treatment at a single center from 2011-2016. We included patients who had a documented total serum OHD level result. Only the most proximal IVF/PGS cycle to the serum OHD assessment was utilized to determine the relationship utilizing Pearson correlation testing. Patients were analyzed who had OHD drawn within 12 months and within 6 months of care. Patients aneuploidy rate by serum OHD levels according to IOM guidelines (<20, 20-30, and >30 ng/mL) and OHD level by aneuploidy rate (0-33%, 34-66%, and 67-100%) were also compared utilizing ANOVA.

RESULTS: There were 1229 patients who met criteria as set forth above. Patient mean age was 35.9 (SD±4.6) years old. Mean aneuploidy rate was 41.3%. Mean serum OHD was 32.0 (SD±14.2) ng/mL. The mean number of days between serum OHD assessment and embryonic aneuploidy assessment was 189.9 (SD±238.5) days. When the patients were limited to those who had OHD drawn within 1 year of the aneuploidy results (n=1076) Pearson correlation (r=-0.046) did not show a relationship (p=0.13). When limited to OHD assessment within 6 months (n=878) the Pearson correlation (r=-0.084) was significantly correlated (p=0.01). OHD levels by IOM guidelines were significantly associated with aneuploidy with a mean aneuploidy rate of 44.6% in those with <20 ng/mL, 43.4% in those 20-30 ng/mL, and 37.8% in those >30 ng/mL (p=0.04). Similarly, aneuploidy rate (0-33%, 34-66%, and 67-100%) was associated with serum OHD levels with a difference in mean serum OHD level of 33.0 ng/mL, 30.8 ng/mL, and 29.9 ng/mL respectively (p=0.02).

CONCLUSION: These data suggest serum OHD levels may be correlated with the likelihood of achieving a euploid blastocyst. However, there are areas of caution which will empower and inform further investigations. Assessment of total serum OHD levels may not be the most precise method of determining OHD metabolic status in clinical care. It may be necessary to have further characterization of the bioavailable and bioactive OHD status. Further, the mechanism of OHD's impact on ploidy rates needs to be further established. There are preliminary data to suggest telomerase and telomere length may be involved and is an area of active study.