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[Title]

Advanced glycation end-products accumulation affects assisted reproductive technology outcomes.

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[Study question]

Do the accumulation of advanced glycation end-products (AGEs) affect the clinical outcomes in ART program?

[Summary answer]

Accumulation of AGEs has been associated with poor clinical outcomes in ART program.

[What is known already]

AGEs are produced endogenously in the body or exogenously by intake of diet containing high levels of AGEs. AGEs are known to play a role in the pathogenesis of several diseases, and recently female infertility by causing oxidative stress, altering enzymatic activities, affecting cytotoxic pathways, or damaging nucleic acids.

[Study design, size, duration]

Prospective study in a clinical-based cohort of 148 women who agreed with measurements after the new patient visit, from November 2015 until December 2016 inclusive.

[Participants/materials, setting, methods]

We measured skin autofluorescence non-invasively by AGE-Reader in female infertility patients (n = 148) seen between November 2015 until December 2016 at HORAC Grand Front Osaka Clinic. To evaluate the cumulative effect of AGEs, we compared cycle outcomes between patients with high-AGEs (HA) and low-AGE (LA). Primary outcome measures were infertility factors and clinical outcomes.

[Main results and the role of chance]

Accumulation of AGEs were higher in fertility patients than in patients whose infertility was attributed to male factors. The AMH levels of patients with HA were significantly lower than in patients with LA (2.1 vs. 3.7 ng/mL, respectively; $p < 0.05$). No correlation was observed between AGEs and other hormones (basal FSH, DHEA-S, testosterone and prolactin). There were no significant differences between the patients with HA and LA in the fertilization rate, rate of good quality embryos, blastocyst rates, rate of good quality blastocysts. Accumulation of AGEs were higher in patients with no pregnancy than in patients with pregnancy (195.3 vs. 175.1 AU, respectively; $p < 0.05$)

[Limitations, reasons for caution]

AGEs were measured three times at the volar side of the arm. Exposure to sunlight is a possible confounding factor in skin AGE accumulation, but the similarity between AGEs measurements taken at the volar side suggests that this effect is probably limited. Clinical outcomes included both ICSI and conventional IVF.

[Wider implications of the findings]

High AGEs levels are a contributing potential biomarker for diminishing ovarian reserve. AGEs accumulations correlated with a lower likelihood of pregnancy. The AGE-Reader is useful as a noninvasive clinical tool for assessment of increasing risk for infertility and may provide information for the development of more effective therapeutic strategies.

[Study funding/competing interest(s)]

None

[Trial registration number]

Not applicable.