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PRIMARY INFERTILITY, OXIDATIVE STRESS AND METFORMIN; IMPACT ON PRIMARY HUMAN GRANULOSA CELL CULTURES

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ABSTRACT

OBJECTIVE: To observe the effect of metformin on oxidative stress (OS) levels and SIRT1 expression in primary human granulosa cell cultures from infertile females.

METHODS: This cross-sectional study was conducted from August 2017 - July 2019 on ten infertile patients after approval from Ethical Review Committee. After written informed consent, follicular fluid of subjects was collected for establishing primary human granulosa cell cultures (HGCs), which were used for testing capacity of metformin to reduce OS in H_2O_2 induced HGCs. Cultured HGCs were divided into three groups: a) Control=HGCs without any treatment, b) Test-1=HGCs induced with H_2O_2 (metformin absent), and c) Test-2=HGCs treated with metformin after H_2O_2 induction. Baseline-OS (control-group) was estimated, it was induced and measured by an increase in optical density (OD) (Test 1&2). Finally, Test-2 was incubated with metformin (1ml of 100mmol/l concentration) and effect of metformin on oxidative stress levels were determined by Mishra oxidative stress assay. Furthermore, effect of metformin to modulate SIRT1 expression in OS-induced cells was analyzed using quantitative-PCR.

RESULTS: Mean age and BMI of subjects was 32.04±2.29 years and 27.61±2.15 kg/m^2 respectively. Test (OS-induced) samples gave an OD of 0.28 (0.16-0.40) while control HGC samples gave an OD of 0.153 (0.09-0.23). Significant reduction was noted in ODs of metformin treated test cells. Relative expression of SIRT1 in metformin untreated and treated cells was 61.5% and 80%, respectively.

CONCLUSION: Metformin was found to suppress oxidative stress in human granulosa cells and increases the expression of SIRT1 in OS induced environment of primary cell cultures.

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CONFLICT OF INTEREST

Authors declared no conflict of interest

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