

ASSOCIATION OF FOLLICULAR FLUID GLUCOSE LEVEL WITH OOCYTES QUANTITY AND EMBRYO DEVELOPMENT CAPACITY IN ART PROGRAM

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INTRODUCTION

One of the most common energy sources for mammalian cells is glucose, which in the cytosol of the cells is converted into acetyl-CoA followed ultimately oxidation to ATP for energy obtaining. Decreased glucose intake or glucose levels in physiological fluids leads to impaired women fertility. The aim of the study was to assess the association of follicular fluid glucose levels with oocytes quantity and embryo development capacity in ART.

MATERIALS AND METHODS

Follicular fluid was collected during follicle aspiration and glucose levels were measured. The obtained data were compared with the number of removed oocytes for each patient. There were three groups: 1 – up to 5 removed oocytes, 2 – the number of oocytes was 6-10, 3 – from 11 to 20. In each group evaluated the degree of maturity of female gametes, their fertilization and blastulation rate.

RESULTS

It has been shown that the number of retrieval oocytes depended on the glucose level in the patient's follicular fluid, the Pearson correlation coefficient was $r = 0.71$. Glucose concentration in the follicular fluid below 2 mmol/l was critical for the oocyte development, as it reduces not only the total number but also the quality of mature gametes. In the group 1 the concentration of follicular fluid glucose was $(0.47 \pm 0.11 \text{ mmol/l})$ and blastulation rate was only 32.7%. In the group 2 the glucose concentration was more than 2 mmol/l and 65.4% of embryo reached the blastocyst stage while in group 3 the glucose concentration did not differ from group 2 but had lower blastulation rate (55.1%)

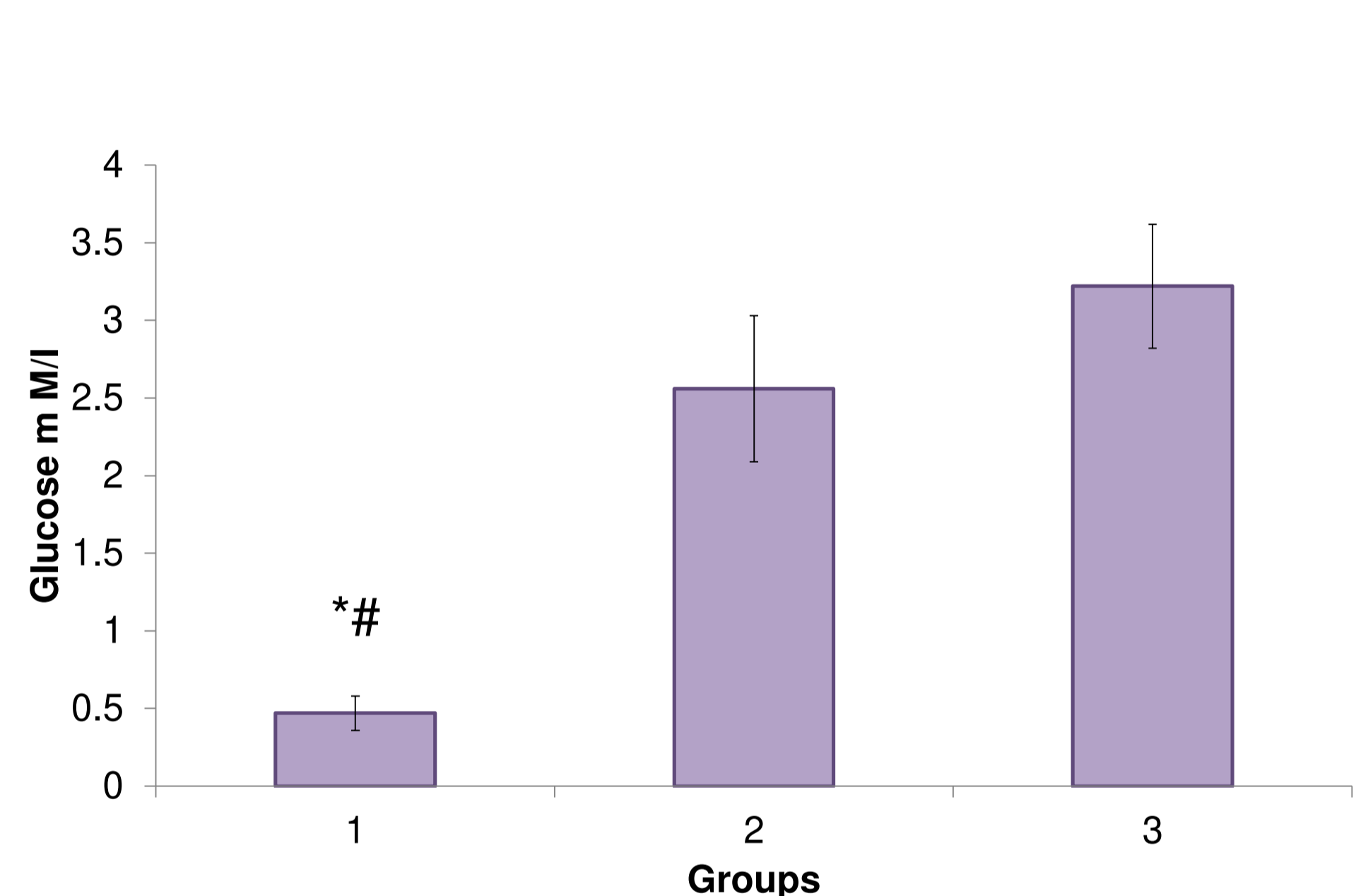


Fig. Glucose concentration in follicular fluid depending on the number of aspirated oocytes. * - significant differences relative to group 2, # - significant differences relative to group 3, $p \leq 0.05$.

Table
Embryological characteristics of the studied groups

Group	The number of mature MII oocytes, %	The number of immature oocytes (MI, GV), %	Fertilisation rate, %	Blastulation rate, %
1	83.2*	16.8*	93.5	32.7*#
2	93.4	6.4	95.0	65.4
3	80.7*	19.3*	92.3	55.1*

Notes: * - significant differences relative to group 2, # - significant differences relative to group 3, $p \leq 0.05$.

CONCLUSIONS

The determined threshold level of glucose concentration in the follicular fluid is an important prognostic criterion for further fertilization of oocytes and embryo development. The absence of a significant difference in fertilization rates between groups that differed in the number of aspirated oocytes and glucose levels may be due, to some extent, to oocyte activation during fertilization by ICSI. Further development of embryos requires large energy resources, the lack of which leads to both consequence, a decrease in the number of retrieval oocytes, resulted embryos at the blastocyst stage.

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