

Systemic effects of clinical follicular fluid from polycystic ovary syndrome and non-polycystic ovary syndrome in female mice

Nidhi Gairola^{1,2}, HR Chitme^{2,*#} & Reema Sircar³

¹Uttaranchal Institute of Pharmaceutical Sciences, Uttaranchal University, Dehradun, Uttarakhand, India

²DIT University, Dehradun, Uttarakhand, India

³Indira IVF, Dehradun, Uttarakhand, India

Received 21 February 2023; revised 16 August 2023

The follicular fluid's composition changes physiologically to meet the demands of specific local phenomena during oogenesis and folliculogenesis. Here, we investigated whether follicular fluid from polycystic ovarian syndrome (PCOS) patients influence the systemic functioning of body compared to the follicular fluid from non-PCOS patients. Follicular fluid was pooled separately from both healthy and PCOS subjects. Tissues and other detritus were separated from the collected fluid by centrifugation. Female Swiss albino mice received 1 and 2 mL/kg of the fluid intraperitoneally, and were observed for 21 days for physiological changes. Variation in body weight was tracked intermittently. Serum was obtained for estimation of oestrogen, progesterone, testosterone, luteinizing hormone (LH), follicle stimulating hormone (FSH), insulin and glucose on the day the animals were euthanized. Liver, kidney, heart, lung, pancreas, spleen and ovary were examined histologically. Haemoglobin and haematocrit levels were found significantly lowered in animals administered with follicular fluid from PCOS patients. Beginning at day 14, there was a significant increase in total body weight. Blood glucose level increased consistently and almost doubled on day 21 from 101.2 ± 0.86 to 201.0 ± 5.34 mg/dL. Serum concentrations of oestrogen and progesterone reduced significantly and testosterone level got increased in PCOS follicular fluid treated animals compared to non-PCOS follicular fluid. Both the LH/FSH ratio and insulin level rose significantly ($P < 0.001$) increased in PCOS follicular fluid treated animals. The HOMA-IR was likewise statistically significantly increased ($P < 0.001$). However, both the HOMA-Beta and QUICKI scores dropped significantly ($P < 0.001$). A PCOS follicular fluid treatment group of female mice showed clear signs of myocarditis, cardiac atrophy and numerous ovarian cysts. The follicular fluid of PCOS patients showed a localised effect, and the components, through the systemic circulation, posed detrimental consequences systemically suggesting involvement in the pathogenesis of PCOS. Follicular fluid from PCOS patients should be further studied for proteomics and its potential in therapeutic, diagnosis and prognosis.

Keywords: Cystic fluid, Folliculogenesis, Ovarian fluid, Ovarian cyst, PCOS