Effect Of Immunomodulatory Agent - Pentoxifylline On In Vitro Blastocyst Development Rate

X. Zhang, R. K. Sharma, A. Agarwal, T. Falcone; Cleveland Clinic Foundation, Cleveland, OH

Objective: Endometriosis is a disease characterized by local pelvic inflammatory process with increased levels of tumor necrosis factor-α (TNF-α) and altered function of immune-related cells in the peritoneal environment. Pentoxifylline, a phosphodiesterase inhibitor, inhibits TNF-α production in vitro and reduces the inflammatory action of TNF-α. Our study was designed to: 1) examine the dose response effect of pentoxifylline, and 2) identify the concentrations, which are not toxic to the embryos.

Design: Prospective in vitro study.

Materials and Methods: 150 two-cell mouse embryos were cultured in different concentrations of pentoxifylline for 72 h. Before starting the culture, each dish containing 1 mL of culture media was incubated overnight for equilibration at 37°C in a 5% CO₂. Mouse embryos were distributed into 6 groups of 6-8 embryos in each group. Pentoxifylline was dissolved in human tubal fluid (HTF) media and used at the following concentrations: 250, 500, 1000, 2000 and 4000 µM. Controls contained an equal volume of HTF media. Blastocyst development rate (%BDR) was examined after 72 hours of incubation.

Results: Pentoxifylline at concentration of up to 500 µM had a blastocyst development rate comparable with the controls. A significant decline in BDR was seen at pentoxifylline concentration of 1000µM compared with controls (%BDR: 75% vs. 96%; P<0.008). Higher concentrations were embryotoxic and %BDR was reduced to zero at 4000 µM pentoxifylline (see Figure).

Figure 1 Effect of various concentrations of pentoxifylline on the percent blastocyst development rate (%BDR) after 72 h of culture. Each point represents the mean of 3 sets of readings with 6-8 embryos in each group.
Conclusion: Pentoxifylline is not embryotoxic at concentrations of up to 500µM. Patients with endometriosis who exhibit elevated levels of TNF-α may benefit from the use of pentoxifylline without significantly affecting the embryo development.

Support: None

Author Disclosure Block:  X. Zhang, None; R.K. Sharma, None; A. Agarwal, None; T. Falcone, None.

Category (Complete): Reproductive Endocrinology: Research (SREI)
Keyword (Complete): blastocyst ; tumor necrosis factor-alpha (TNF-α) ; embryo ; pentoxifylline

Additional (Complete):
  Presenting Author Fellow : Yes
  In-Training Award: : True
  ACCME Disclosure: : I will not be discussing non-FDA approved products
  I Agree : True

Status: Complete