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Morphometry after implantation of bovine embryos submitted to thermal stress during IVP

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Induced thermotolerance is a biological phenomenon that consists of cellular resistance after heat treatment and our hypothesis is that this phenomenon can be used for the benefit of embryos in periods of thermal stress. The objective of this study was to induce thermotolerance in bovine embryos and to analyze their development after implantation in the recipients. For this purpose, F1 Holstein-Gir cows were aspirated to obtain oocytes and embryos were produced by *in vitro* fertilization using conventional protocols. The embryos of the TT group were submitted to the temperature increase curve varying from 39 to 40.5°C, for 6h, 144 hpi. 168hpi blastocysts (N 33, 56TT and 77C) were transferred to crossbred Holstein-Gir recipients, between November/2017 and February/2018, in four replicates. The gestations were followed from days 31 to 55, every 6 days, by ultrasonography, measurements were made of the area of the embryonic vesicle (VES); caudal skull length (CCC); biparietal diameter (DBP); and fetal heart rate (HR). CEUA 3956180316. The means of the measurements were analyzed statistically through the Student's T-Test. There was no differences between gestation rates of the groups (C=22, TT=18, P=0.70, Fisher exact test). At 31 days of gestation (D31) there was no difference between the areas of VES between groups (C=9.71 ± 1.61mm², TT=9.68 ± 1.14 mm², P=0.9495). In the D37 the VES area was higher in the TT group (C=13.71 ± 1.67 mm², TT=15.81 ± 2.41 mm², P=0.0062). In D43, D49 and D55, there were no differences between VES area between groups (D43, C=20.98 ± 2.37 mm², TT=21.87 ± 2.47 mm², P=0.2781, D49, C=28.8 ± 2, 35 mm², TT=30.04 ± 2.50 mm², P=0.1377, D55, C=36.43 ± 3.77 mm², TT=37.87 ± 3.58 mm², P=0.2580). The CCC did not differ on days D31, D37, D43, D49 and D55 between the groups (D31, C=9.38 ± 1.43 mm, TT=9.50 ± 0.96 mm, P=0.7976, D37, C=15.62 ± 2,02mm, TT=16.05 ± 1.87mm, P=0.5073, D43=23.03 ± 1.72mm, TT=23.06 ± 1.97mm, P=0.9628, D49, C=31.95 ± 1.78mm, TT=31.85 ± 1.65mm, P=0.8649, D55, C=45.76 ± 3.79mm, TT=45.38 ± 2.72mm, P=0.7321). The DBP did not differ on days D43, D49 and D55 between groups (D43, C=8.06 ± 0.70 mm, TT=8.37 ± 0.47 mm, P=0.1198, D49, C=10.59 ± 0.83 mm, TT=10.62 ± 0.55 mm, P=0.9155, D55, C=12.50 ± 0.87 mm, TT=12.43 ± 1.20 mm, P=0.8530). The HR did not differ on days D43, D49 and D55 between the groups (D43, C=183.23 ± 6.94bpm, TT=185.53 ± 6.39bpm, P=0.3547, D49, C=181.05 ± 3.76bpm, TT=182 ± 4.74bpm, P=0.5626, D55, C=173.93 ± 11.06bpm, TT=178.07 ± 6.35bpm, P=0.2188). Although direct effects on pregnancy rates and fetal growth were not observed, the heat treatment performed was safe and did not affect fetal implantation and development. The increase in size of the germinal vesicle in the TT group suggests benefit to the embryos treated in the initial stages of formation of the appendages and fetal membranes, possibly through an adaptive response. Developments in this study are ongoing.

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