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Characteristics of Calves Produced by Oocyte Pick-up and in Vitro Fertilization

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RESUMO:

Introduction

The use of assisted reproductive techniques (ART) in Brazilian cattle industry, including in vitro embryo production, has increased significantly in the last few years. However, these techniques still show problems that limit their use. Embryo production rates are usually low, and the proportion of pregnancy abnormalities and stillbirth is high. Under in vitro culture conditions, embryos are exposed to an environment different from which it would have in vivo, and this is one of the supposed causes of the developmental problems observed (YOUNG et al., 1998). The birth of overweight calves, known as the "large offspring syndrome", is frequent and associated with dystocia, stillbirths or low viability of newborn calves. The aim of this study was to evaluate characteristics of calves born from embryos produced by oocyte pick-up and in vitro fertilization.

Material and Methods

The present study was performed in the Embrapa's Dairy Cattle Research Center, in Juiz de Fora, MG. Holstein (n=5) and Gir (n=8) cows were used as cumulus-oocyte complexes (COCs) donors. Oocyte pick-up was performed using a portable ultrasound device equipped with a 7.5 sector intravaginal transducer. The COCs recovered and morphologically classified as viable were in vitro matured, fertilized with previously capacitated sperm of bulls from the same breed of the donors, and co-cultured with cumulus cells for seven days. The blastocysts produced were non-surgically transferred to previously synchronized and evaluated recipients. Pregnancy diagnosis was performed by ultrasound 20 to 23 days after transfer, and pregnant recipients were monitored until parturition. At parturition, recipients were clinically evaluated for the occurrence of dystocia and retained placenta, and the newborns for viability, weight and physiological parameters.

Results and Discussion

From the 20 pregnancies monitored in the present study (14 from Gir and 6 from Holstein), there was two stillbirth (one Gir and one Holstein), a proportion of newborn problems similar to that observed in other studies with pregnancies of *Bos taurus* embryos produced in vitro (SCHIMDT et al., 1996; KRUIP & DEN DASS, 1997). Other two parturitions needed assistance (one Gir and one Holstein) due to oversized offspring or low body score condition and weight of recipient. There was no report of retained placenta, which is coherent with the previous observation that placentation of in vitro produced embryos is more superficial and detachment easier. Holstein calves showed normal, according to SMITH (2002), physiologic parameters after calving: body temperature of $39.76 \pm 0.43^\circ\text{C}$, heart rate of 126 ± 19.4 beats/min. and respiratory frequency of 75.8 ± 36.72 movements/min. Gir calves showed lower values for these parameters: $38.58 \pm 1.14^\circ\text{C}$, 85.27 ± 13.29 beats/min. and 41.31 ± 8.17 movements/min., and also a greater proportion (43.75%) of calves presenting an altered color of oral mucosa. Birth weight of Holstein calves was 39.00 ± 7.04 kg, similar to the weight expected for this breed. However, Gir calves presented 30.62 ± 4.09 kg at birth, higher than the average expected for Gir breed, which is around 25 kg (BACALHAU et al., 1992).

Conclusion

Although newborn problems were in the expected range, Gir calves born from

in vitro produced embryos show a trend to be heavier and some altered physiologic parameters at birth and therefore may need more care during afterbirth period.

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PALAVRAS-CHAVE: bovine, oocyte pick-up, in vitro fertilization