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Comparison of stress and animal welfare caused by the procedures of embryo collection by either surgical or non-surgical via in sheep

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In ovine species, embryo collection is commonly done by laparotomy (LP). However, this technique promotes adhesions in the reproductive organs leading to fertility impairment and affecting animal welfare. The non-surgical method, done by transcervical route (TC), although less invasive and expensive, can also affect animal welfare due to the cervix mechanical manipulation. In this perspective, biochemical markers of inflammation, as acute phase proteins, are considered reliable parameters of the systemic response to inflammatory processes. In addition, the measurement serum glucose can indicate high stress levels. Thus, this study aimed to determine the levels of acute phase proteins (total protein and albumin) and of stress (glycemia) in ewes submitted to either LP or TC embryo collection. Santa Inês ewes (n=27) were superovulated using the Day Zero protocol (Menchaca et al., Theriogenology, 68: 1111-17, 2007), followed by natural mating. Cervical dilation was induced in all ewes with estradiol benzoate i.v. (20 μg/mL; RIC-BE; Agener União, São Paulo, Brazil) and cloprostenol i.m. (0.12 mg; Estron; Agener União) 12 h prior to collection and oxytocin (100 IU, Ocitocina Forte UCB, Centrovet, Goiânia, Brazil), 15 min prior to embryo collection. A cervical transposition test was performed to define which method should be conducted. LP collection (n=11) was performed under general anesthesia (Lima et al., Animal Production Science, 56:1463-8, 2015). TC collection (n=16) was performed as proposed by Fonseca et al., Small Ruminant Research, 111: 96-9, 2013, with a circuit closed system. Blood samples were collected before fasting (M1) and of the sedation (M2), during collection (M3) and at various moments after collection: immediately (M4), and 1 h (M5), 3 h (M6), 6 h (M7), 12 h (M8), 24 h (M9), 48 h (M10). Data were evaluated by Kruskal-Wallis test at 5% of significance. LP and TC collection differed in serum glucose concentrations in M4 (LP: 72.7 ± 17.4 *vs*. TC: 102.2 ± 22.9 mg/dL), in M9 (LP: 64.0 ± 12.3 *vs*. TC: 55.1 ± 4.3 mg/dL) and in M10 (LP: 61.3 ± 11.8 *vs*. TC: 52.6 ± 4.1 mg/dL) ($P<0.05$). In M10, there were differences in albumin concentrations (LP: 1.9 ± 0.4 *vs*. TC: 2.1 ± 0.3 g/dL) and serum proteins (LP: 5.3 ± 0.5 *vs*. TC: 5.7 ± 0.4 g/dL) ($P<0.05$). In both methods, there was no effect ($P>0.05$) of the evaluation moment on serum proteins and albumin concentrations. In TC method, an increase in glucose in M3, M4, M5 and M6 ($P<0.05$) was observed compared to other moments. A similar pattern was observed in the LP method where the increase was concentrated in M3, M5 and M6 ($P<0.05$). In conclusion, the LP method induced a greater inflammatory response due to serum albumin drop 48 h after collection, and higher level of stress due to elevated serum glucose.

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