

RECYCLING OF CATHETER FOR EMBRYO RECOVERY: A TOOL FOR COSTS REDUCTION IN EQUINE EMBRYO TRANSFER

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ABSTRACT

The embryo transfer is becoming a widespread practice. Most embryos are collected from spontaneous single ovulating mares and result in 50% of embryo recovery, increasing the costs of production. To illustrate, the price of a catheter for embryos recovery range from US\$ 194.00 to US\$ 250.00 (R\$ 350.00 to R\$ 450.00). Therefore, the aim of this work was to verify if catheter with damaged balloon can be recuperated and reused without altering its efficiency. For this study, two groups were used: a control group (GI, n=10), on which the nonsurgical recovery of the

embryos of mares was performed with the catheter with original balloon; and another group (GII, n=20), in which a restored catheter was utilized. The mares of GI had an embryo recovery rate of 60%, and GII mares had an embryo recovery rate of 55%. There was not statistical difference between groups I and II (P>0.05). Considering that the material used to restore the catheter costs US\$16.66 (R\$30.00), this data show that the recuperation of the catheters for embryo recovery in mares may reduce costs without compromising the rates of embryo recovery.

KEYWORDS: equine, embryo transfer, catheter recycling, costs reduction

RESUMO

RECICLAGEM DE CATETERES PARA COLHEITA DE EMBRIÃO EM EQUINOS: UMA FERRAMENTA PARA REDUÇÃO DE CUSTOS

A transferência de embriões está se tornando uma prática largamente utilizada. Apesar disso, na indústria de equinos, a colheita dos embriões é realizada a partir de ovulações simples, resultando em recuperação de, aproximadamente, 50%, o que aumenta os custos de produção. Cite-se como exemplo o custo do cateter para colheita do embrião, que varia de R\$ 350,00 a R\$ 450,00 (US\$ 194,00 a US\$ 250,00). Assim, com este trabalho objetivou-se verificar se cateteres com balão danificado podem ser recuperados sem alterar a sua eficiência. Para o estudo utilizaram-se dois grupos: controle (GI - n=10), em que a colheita não cirúrgica dos embriões

das éguas foi realizada com cateter original; e o tratamento (GII - n=20), submetido à colheita do embrião com cateter recuperado. O custo do material utilizado para recuperar os cateteres foi de R\$ 30,00 (US\$ 16,66). Para as éguas do GI, obteve-se uma taxa de recuperação embrionária de 60% e no GII de 55%, não havendo diferença (P>0,05) entre os grupos. Considerando o baixo custo do material utilizado para recuperar os cateteres, conclui-se que sua recuperação, visando à reutilização na colheita de embrião de éguas, pode reduzir consideravelmente o custo final da técnica, sem comprometer as taxas de recuperação embrionária.

PALAVRAS-CHAVES: Equino, recuperação de cateter, redução de custos, transferência de embrião.

INTRODUCTION

Mean embryo recovery from single ovulating mares in commercial embryo transfer (ET) programs is approximately 50% (SQUIRES et al., 1999; CARVALHO et al., 2001), although, other rates ranging from 40 to 80% have been found (RIERA & McDONOUGH, 1993; SQUIRES, 1993; TISCHNER & TISCHNER, 1996; FLEURY, 1998). There are many different reasons for this great amplitude of results, such as age of the mare (SQUIRES et al., 1999), fertility of the donor (KATILA et al., 1989; SQUIRES et al., 1999), day of embryo recovery (McKINNON et al., 1988), number of ovulations (SQUIRES et al., 1987a,b; ROSA et al., 1998), stallion (DOUGLAS, 1979; CASTLEBERRY et al., 1980; PASHEN et al., 1993), quality of semen (SQUIRES et al., 1999), and the occasion of the reproduction season (McKINNON et al., 1988).

The maintenance of animals enrolled in the ET programs as well as the material used in its procedures turns the ET in horses into a great challenge, considering the high operational costs. Thus, only animals with high genetic value should be used as donors (SQUIRES et al., 1999).

The material used in the non-surgical procedure of embryo recovery increases the costs of ET in horses, specially the catheter, whose prices vary from US\$ 209.375 to US\$ 281.25 (R\$ 350.00 to R\$ 450.00) each. The catheter is a very fragile equipment, and any puncture in its balloon turns it useless. Therefore, the aim of this work was to verify if recycled catheters could be used for embryo recovery in mares, without altering the equipment efficiency and reducing the costs.

MATERIAL AND METHODS

In this experiment, Mangalarga 30 mares, raised on Tanzania and Pangola pasture, were used. They also received mineral salt specialized for equines ad libitum. All animals were treated with a specific vermifuge for horses with ivermectine. All the animals came from a property in the city of Santo Estevão, Bahia / Brazil, a semi-arid region, with rainfall of approximately 800 milimeters per year and a low air humidity rate.

The experiment was carried out during the months of January and February. The thirty mares were equally and collectively handled. The handling system comprised daily oestrus notification, and group teasing, in order to identify reproductive activity. All animals went through the same pattern of treatment, which consisted of the application of 250 µg of cloprostenol (Ciosin, Schering-Plough, São Paulo, Brazil), oestrus detection and follicle development control by palpation per rectum until the day of ovulation. All mares were covered by the same stallion and the embryos were collected seven days after the determination of ovulation.

The animals were randomly divided into two groups. In group I (n=10), the embryo recovery was done with a brand new catheter with an original balloon, and in group II (n=20), used catheters with recycled balloon were used (Disposable Balloon, Ref. 006448, IMV, L'Aigle, France).

The procedure for recycling the catheter was performed as follows: after finding a damaged balloon, it was manually removed from the catheter, and was replaced by a new one, commercially available, inserted with the help of pliers (IMV, Ref. 007799, L'Aigle, France). The pliers should be moistened with distilled water to facilitate their removal after inserting the new balloon, which is manufactured in such a way that there is no need for glue after insertion. After the procedure described above, the recycled catheter was packaged and sterilized with ethylene oxide by a specialized company.

The recycled catheter was evaluated regarding the tolerance to pressure with a volume of air (60mL), capacity of fixation to the mare's uterus (assessed by manual traction after fixation of catheter) and its efficiency in recovering embryos, in comparison to catheters with the original balloon.

The catheters to be used in both groups had their balloons inflated with air for 30 minutes before initiating the procedure, in order to verify any possible linkage.

The procedure to recover the embryos consisted of manually placing the catheter into position through the cervix and injecting 60 mL of air to inflate the balloon. After notifying that the catheter was properly placed, one liter of ringer with lactate was injected and recovered. This procedure was repeated three

times totalizing three liters per mare submitted to embryo recovery. The flushed material was filtered and evaluated in order to verify the presence of an embryo.

Chi-square test was used to evaluate the difference of embryo recovery among groups I and II, with significance level of 5%.

RESULTS AND DISCUSSION

Most embryos recovered came from single ovulating mares. Similar results were found by other studies about horses. The embryos were recovered from day seven to day eight after ovulation (Day 0 = ovulation day), as suggested by most authors (BATTUT et al., 1997; SQUIRES et al., 1999; FLEURY et al., 2001).

The balloons were submitted to a pressure from 60 to 80 mL of air (FLEURY et al., 2001; SQUIRES et al., 2003). Both new and recycled catheters

demonstrated tolerance to this kind of pressure, as well as good fixation to the uterus. The recycled catheters were used up to three times each. A brand new catheter and a recycled one are shown in the Figure 1.



FIGURE 1. New catheter with the original balloon (left) and recycled one (right) inflated with 60 mL of air (original picture).



FIGURE 2. Sequence of catheter recycling (original picture).

The mares from group I (new catheter) and group II (recycled catheter) had an embryo recovery rate of 60% and 55%, respectively. There was no statistical difference between groups I and II ($p > 0.05$). The mean rate of embryo recovery in mares in commercial programs of ET is approximately 60% (LOGAN et al., 2007; MORTENSEN et al., 2009). Similar results were found in this experiment with the recuperated catheters.

The material used to recycle the catheter costs US\$ 16.66 (R\$ 30.00), while the costs for purchasing of a new catheter may range from US\$ 194.00 to US\$ 250.00 (R\$ 350.00 to R\$ 450.00) each. Both balloons and the pliers can be purchased directly with the equipment manufacturer.

Figure 2 shows the proper material used to recycle the catheter. These figures show a recycled catheter, the balloon used to restore it and pliers for the insertion of the balloon.

CONCLUSIONS

Considering that the restored catheter possesses the same performance as the new ones with original balloon, regarding tolerance to pressure, capacity of fixation to the mare's uterus and embryo recovery efficiency, and that the material used to recycle it costs US\$ 18.75 (R\$ 30,00), this experiment demonstrated that the restored catheters could be used as a tool for cost reduction on the recuperation of equine flushing.

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