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THE EFFECT OF EPIDURAL ADMINISTRATION OF FSH IN BOVINE SUPEROVULATION PROTOCOL

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Abstract
FSH is an important component of superovulations programs in the cow, its administration being made routinely intramusculary, at 12 hours intervals for 4 days. The aim of the study was to evaluate the efficacity of single-dose FSH administration on a mixed route (epidural and intramusculary). 6 cows (Holstein and Montbéliarde) were superovulated according to the following protocol: on day 0 – vaginal application of progesterone spiral (PRID®, CEVA, France); day 7- administration of FSH (Folltropin-V®, Bioniche, Canada) 200 mg epidurally and 200 mg intramusculary; day 9 – administration of 250 mg D- sodium cloprostenol (Prostol®, Syva, Spain) and removal of PRID. Response monitorization was made by ultrasound exams of the ovaries on days 12 (during estrus) and 19 (the day of embrion collection). On average, 14 follicles (minimum 8, maximum 20) and 9 corpora lutea (minimum 6, maximum 12) were identified per donor compared to 15 follicles (min 8 max 22) and 9.5 corpora lutea (7 minimum, maximum 12) per donor in the routine protocols. The results show a very close efficacy to those obtained by classical protocol with daily intramuscular administration of FSH. Due to the epidural administration of FSH, deduction of stres for the donor and of the time of treatment, the method can be used in the protocols of embryotransfer in the cow.

Key words: *FSH, cow, poliovulation, embriotransfer.*

INTRODUCTION

Obtaining calves with high genetical value is a major goal for farm practicioners. Difusion of genetic progress in a bovine population can be accomplished by two strategies: the paternal way, by increasing the intensity of artificial inseminations with semen from a given male and through maternal way, when a female produces more than one calf per year (gemelar gestation). Since gemelar pregnancies are not frequent enough in the bovine population, the only way for maximizing the maternal genetical inheritance remains the embryotransfer.

Over the years, many protocols have been tried in order to obtain as many embryos as possible from a certain donor. Different hormonal products based on seric gonadotrophins or GnRH have been tried, but the most efficient of all proved to be the purified porcine FSH extract.

At the same time, a constant goal was to reduce the stress for females and to simplify the superovulations protocols, in order to collect more embryos from the donor and of better quality.

MATERIALS AND METHODS

Six dairy cows donors (Montbeliarde and Holstein breeds) were selected for embryo collection. Donor sellection was made in accordance with the folllowing phenotypic characteristics: body conformation, milk production, reproductive activity and physico-chemical caractheristics of milk.

Throughout the whole study time, the donor cows were housed in comfortable and well ventilated shelters, with ad libitum access to fresh water and they were fed with optimized nutritional ratios according to their physiological status and production group.

The following products were used: FSH (Folltropin-V®, Bioniche, Canada), a slow release progesterone device manufactured of a silicone elastomer (PRID®, CEVA, France) and D-sodium cloprostenol (Prostol®, Syva, Spain), a synthetic omologue of $PGF_{2\alpha}$.
In order to monitor the ovarian response determined by the superovulaton protocol, we used a linear Tringa ultrasound machine (Esaote®, Olanda).
Treatment was initiated in the 4th day of the estral cycle. The introducing of the progesterone slow releasing intravaginal device (PRID) (fig. 1) was considered day 0 of the superovulation protocol.

Figure 1. Devices and applicators used for intravaginal insertion

On the 7th day, purified FSH obtained from swine pituitary gland (Folltropin-V) (fig. 2) was administered in a mixed manner: 200 mg epidurally and 200 mg intramusculary (Tasdemir et al., 2012).

Figure 2. Product Folltropin used in poliovulation protocols

In the 9th day, $PGF_{2\alpha}$ was administered intramusculary and PRID was extracted.

In the 11th day of the treatment protocol, the donors showed signs of heat and they were ineminated with frozen semen straws (first insemination at the begining of the heat, than 2 more inseminations 10 – 12 hours apart) (the AM / PM scheme) (fig. 4).
The ovarian response was monitored through ultrasound examinations starting at 3 days after the administration of $PGF_{2\alpha}$ in order to identify ovarian follicles (Hanzen, 2008; Mapletoft and Hasler, 2014).
The next ultrasound exam was conducted in the day of embryo collection, in order to identify the luteal bodies formed after ovulation.
Classical poliovulation protocols include administration of FSH for 4 days, b.id. This makes the protocol more time consuming and more stressful for the females (Robertson, 2005) (fig. 5).
Statistical analysis was done with SPSS ver. 18 (IBM, USA).

RESULTS AND DISCUSSIONS

Following the ultrasound exam of donors during estrus, a mean of 14 follicles per donor was identified. (fig. 3). There were donors with only 8 preovulatory follicles (1,8 – 2,2 cm diameter). This were mainly older females. In other donors, 20 ovarian follicles were identified. These were young, primipaorus or secundipaorus females, just starting their productive lives.

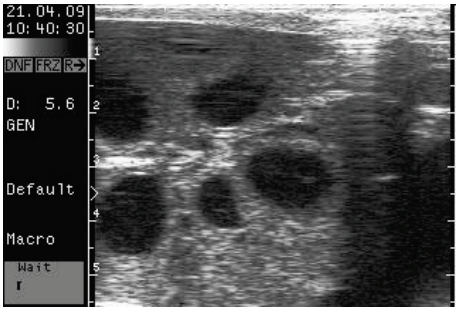

Figure 3. Ultrasound image with superovulated ovary (original)

In the classic protocols with a b.id. administration of FSH for 4 days, a mean of 15 follicles per donor was reported (Bó et al., 2004).
There is not a significant difference ($p > 0,05$) between the results obtained in the study and the classic protocol.
In the day of embryo collection, a mean of 9 luteal bodies (minimum 6 and maximum 12) was seen at the ultrasound exam.
For the classic superovulation protocols, a mean of 9,5 luteal bodies per donor was reported (Bó et al., 2004).
There is no statistical difference ($p > 0,05$) between the mixed way protocol and the classic one.
Due to the unique administration of the FSH in a mixed manner (epidurally and intramusculary) is easier, faster and less stressful for the donors. At the same time, the results regarding the ovarian response are almost similar for the two superovulation protocols.

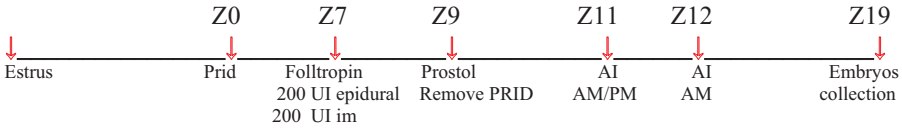

Figure 4. Graphic representation of mixed FSH administration

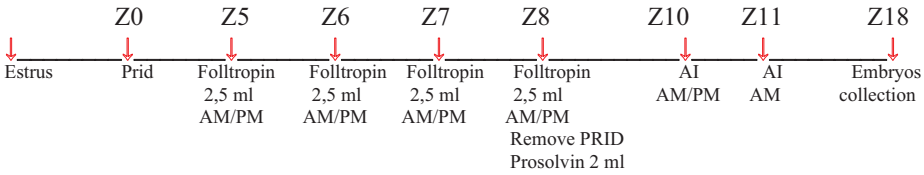

Figure 5. Classic protocol for superovulation (FSH is administered 8 times).

CONCLUSIONS

The results show a very close efficacy for the mixed way administration of FSH (epidurally and intramusculary) to the classical protocol with daily intramuscular administration of FSH. Due to the epidural administration of FSH, the stress over the donor is significantly reduced, the time for treatment is lowered. Thereby, we state that the method can be used in the poliovulation protocols for bovine embryotransfer.

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