Factors affecting fertility in a commercial frozen semen insemination program

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Introduction

Timing of insemination, mare selection and stallion fertility has been described as important factors in the successful outcome in the use of frozen semen [1,2]. Other factors such as use of hormones and different treatment regimens have as well been described with the use of frozen thawed semen as well as with the use of fresh and cooled semen [2]. In order to optimize the use of frozen-thawed semen, a study was performed to identify factors influencing the pregnancy results following insemination with frozen-thawed semen in a Danish equine practice.

Material and Methods

Records from 490 mares (971 oestrus cycles) inseminated at one commercial insemination centre were used in this study. The mares were examined by rectal ultrasound during oestrus with eight hours interval until ovulation, and inseminated postovulatory with frozen-thawed semen from 133 different stallions. Ovulation was never chemically induced. In total 389 mares (789 oestrus cycles) had a known pregnancy result. The design of the study was a retrospective observational accumulated cross-sectional study. Multivariable logistic regression was used to identify significant factors associated with the pregnancy result. Data were analysed using Statistical Analysis System (SAS vers. 9.1.3). The significance level was set at P=0.05.
Results

The pregnancy percent were per season 61.4 % and per cycle 39.1 % with in average 1.98 cycles per mare. Following factors had a significant negative influence on pregnancy results: 1) Minimum one positive endometrial culture (P=0.007); 2) Oestrus induction with prostaglandin (P=0.007); 3) No or poor signs of oestrus (P=0.032); 4) AI with one single mini straw (0.5 ml) compared to AI with macro straws (2.5 to 5.0 ml) or multiple mini straws (0.5 ml) (P<0.001); 5) Breed of mare (P=0.005); 6) Number of cycles inseminated (P<0.001); 7) Accumulation of fluid before insemination (P=0.043). Following factors had a significant positive influence on pregnancy results: 1) Caslicks operation performed (P=0.009), 2) Year of insemination (P=0.049). The factors 1) Accumulation of fluid after insemination; 2) Time of the year for first insemination; 3) Uterine treatment or lavage; 4) Positive endometrial cytology; 5) Twin pregnancy; 6) Uterine cysts, had no influence on pregnancy results.

Discussion

The selection of mares regarding history of fertility problems is important for the final outcome and fertility at all breeding facilities. The pregnancy percent in this study is probably influenced by the fact, that mares with a history of previous fertility problems, at the insemination centre in the study in general were recommended a breeding protocol other than the use of frozen semen.

The negative influence of oestrus induction with prostaglandin is not believed to be due to prostaglandin by itself, since mares only were treated with prostaglandin in the case of poor oestrus
signs. Reports of low fertility of an oestrus cycle has however been reported if the interval between prostaglandin injection and ovulation was shortened (less than 8 days) [3].

Endometrial culture was only performed on clinical indication or after more than two barren oestrus cycles. This could explain the negative influence of culture on the pregnancy result. It should be noted, that if an endometrial pathogen was identified and treatment conducted, the chances of the mare to become pregnant was the same, as if no endometrial culture was performed.

The poor correlation between the outcome of endometrial cytology and fertility has been reported by other authors [4].

In this study insemination with semen doses frozen in macro straws or multiple mini straws is superior to insemination with semen frozen in single mini straws. This result correlates with studies earlier described by other authors [2].

References


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