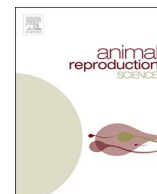




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Descriptive study of current therapeutic practices, clinical reproductive findings and incidence of pregnancy loss in intensively managed thoroughbred mares

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ABSTRACT

Therapeutic practices in equine reproductive medicine have dramatically evolved over the last 20 years but current usage is not described. The aims of this study were to provide a description of medication use and clinical findings of reproductive examinations alongside measures of reproductive efficiency in thoroughbreds. A prospective cohort study was conducted in the 2013 and 2014 breeding seasons. Mare and stallion details, information on veterinary interventions and findings of reproductive ultrasound scans were collected using questionnaires and entered into a custom-designed Microsoft Access database. Descriptive summary statistics were derived directly from the database and using Microsoft Excel. Information was collected from 2246 pregnancies in 1754 mares from 29 stud farms. Ovulatory induction agents were used in 91.8% of cases, oestrus induction agents in 38.4% and covering therapies in 62.7%. Intrauterine antimicrobials were used in 49.6% of mares. Single pregnancies accounted for 83.9% of pregnancies, twins for 15.3% and triplets for 0.7%. The overall incidence of pregnancy loss between days 15–42 was 6.4% (95% CI 5.4%, 7.4%) and 1.6% (95% CI 1.1%, 2.1%) between days 43–65. A further 1.3% of pregnancies were lost by October and 4.5% by birth (including stillbirths). Eighty-three percent of all pregnancies resulted in a live foal. In conclusion, there has been a considerable increase in the use of reproductive therapeutics over the last 12 years. Nonetheless, incidence of pregnancy loss and live foal percentages remain essentially unchanged. Risk factor studies are required to determine if the substantial increase in therapeutic usage is conferring positive benefits.

1. Introduction

The economic repercussions of equine reproductive failure and costs involved in attempting to improve reproductive parameters are considerable (Bosh et al., 2009a). Additionally, increased veterinary requirements and repeated covers resulting from failure to conceive or early pregnancy loss (EPL) are associated with welfare and safety implications for both mares and stallions (Campbell and Sandøe, 2015). Keeping abreast of changes in veterinary reproductive management to ensure the efficacy of interventions in relation

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to reproductive efficiency is paramount in identifying areas of strength and, equally, areas of weakness where research to assist the industry can be focused.

A 2002 study of reproductive parameters from the 1998 UK breeding season showed that 27.8% of oestrous cycles were induced by exogenous hormones whilst ovulation was induced in 51% of cycles ($n = 1911$) (Morris and Allen, 2002). Overall, 12.2% of cycles received uterine treatments which included oxytocin, intrauterine antibiotics and saline lavage. By the 2002 breeding season, the percentage of oestrous cycles induced had increased to 39.6% and the use of ovulatory induction agents to 59.1% ($n = 5005$). Whilst the use of ovulatory agents significantly reduced the number of matings per pregnancy, they were found to have no effects on per cycle pregnancy rate itself (Allen et al., 2007). Uterine treatments were used in 32.6% of cycles in flat racing mares. This was a substantial increase from 12.2% just 4 years previously. Despite these large increases in therapeutic interventions, the per cycle pregnancy rate showed only modest increases from 59.9% to 63.9% whilst the percentage of live foals in flat racing mares was 82.7% in the 1998 season and 79.1% in the 2002 season (although this latter figure did not account for 3.7% of pregnancies in which the outcome was unknown).

The largest area of reproductive wastage shown in studies worldwide is pregnancy loss in the embryonic period (Allen et al., 2007; Nath et al., 2010; Hanlon et al., 2012). The most recently reported incidence of EPL in UK flat racing thoroughbreds was from the 2002 season and showed it to affect 7.2% of pregnancies (Allen et al., 2007). The definition of EPL in the mare varies between studies but it most typically refers to loss of pregnancy in the embryonic period between the day of diagnosis and gestation day 42. Losses occurring during the period of conceptus attachment and microcotyledon establishment, commencing around day 40, have not been quantified. These are major physiological events of early pregnancy, critical for its success.

There have been no large scale evaluations of reproductive efficiency of thoroughbred mares in the UK for over a decade and the last study conducted on American thoroughbreds was from the 2004 breeding season (Allen et al., 2007; Bosh et al., 2009b). Additionally, data relating to medication usage and ultrasonographic findings in these studies were limited. A more recent New Zealand study described efficiency over the 2008 and 2009 breeding seasons but provided no measure of therapeutic use or reproductive examination findings (Hanlon et al., 2012). Reproductive management has evolved and anecdotal evidence suggests that the use of therapeutic interventions has increased. An updated study to reflect the current practices used in reproductive medicine and any concurrent changes in measures of reproductive efficiency is, therefore, warranted. This paper aims to provide a detailed description of current therapeutic practices, clinical findings of reproductive examinations and measures of reproductive efficiency in the management of thoroughbreds in and around Newmarket, UK.

2. Materials and methods

2.1. Study design and period

A prospective cohort study was conducted recording details on the reproductive management and occurrence of pregnancy loss in thoroughbred broodmares located on stud farms under the care of two large equine veterinary practices based in Newmarket, UK. Data were collected over the 2013 and 2014 breeding seasons.

2.2. Sample size calculation

Sample size calculations performed for a concurrent study investigating risk factors for EPL suggested data were needed from around 2000 pregnancies. For the purpose of this descriptive paper, this allows estimation of EPL incidence with a precision of 1–2%, assuming a true incidence of 7% and a 95% confidence level.

2.3. Selection of studs and horses

A convenience sample of 29 stud farms located in Suffolk, Norfolk and Hertfordshire was recruited through the two collaborating veterinary practices. Permission for the use of data was received from all studs and data made available for all mares on the farms. The inclusion criterion for a mare to be entered into the study was a positive day 14–17 routine pregnancy scan. Data were only collected for mares with clinical findings recorded throughout the entire period of early pregnancy (days 15–65).

2.4. Data collection

At the time of the initial positive pregnancy scan between gestational days 14–17, a questionnaire (Supplementary Survey 1) was completed by the stud secretary, the attending veterinarian or an investigator (BR). The following information was recorded:

Mare data: name, age, stud farm, attending veterinarian, breeding status at the start of each season (defined as maiden – never mated, foaling – foaled at the start of the breeding season, barren – mated without a pregnancy in the previous year, rested – parous mare deliberately not mated the previous year) and if the mare suffered an EPL in the previous season.

Stallion data: name, age and book size.

Veterinary reproductive data: start of season foaling date (foaling mares only), administration date/duration/dose of pre-oestrus hormone treatments, ovulatory induction agents and post covering therapies, number of oestrous cycles covered before the positive pregnancy scan, covering date(s), ovulation detection date and number and location of ovulation(s), presence of uterine fluid or uterine abnormalities post covering.

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