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Management of twinning in mares by manual crushing at day 16 to 17 of pregnancy

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Abstract

Twin pregnancy is a commonly encountered non-infectious condition in equines having distressing effects on health and future fertility of mares as well as significant financial implications. Using ultrasonography, twins can be dealt relatively easily and effectively during early pregnancy. Elimination of one embryo might be accomplished by application of pressure on one embryo manually or by using the ultrasound probe (allantocentesis) leading to disruption of the embryonic vesicle, while leaving the other embryo intact. The present study reports the successful management of twinning in mares ($n = 7$) at day 16 to 17 pregnancy by means of manual crushing using rectal pinch methodology. In present study, viable singleton pregnancy was observed in all animals excluding one case, as observed by ultrasonography two weeks post treatment (day 30) and success rate 85.71% (6/7) was observed. Therefore, manual crushing at day 16-17 is an efficacious treatment strategy for management of twinning in mares.

Keywords: Manual crushing, mare, pregnancy and twinning

Introduction

Horses are a monotocus species; they deliver one foal per gestation and are hardly able to nourish more than one foal to term [6]. Twins are a substantial cause of reduced reproductive efficiency in the mares (10% - 30% incidence rate) and usually result in abortion, stillbirth or early foal death [5]. Thoroughbred has a particularly high incidence of multiple ovulations at 20 to 30% [6, 2]. Twins can be: unilateral (present in the same uterine horn) or bilateral (present in separate uterine horns) [8] besides synchronous (same size) or asynchronous (different size). Asynchronous twins have variable size either due to different gestational ages or due to delayed growth of smaller vesicle. Occasionally occurrence of endometrial cyst with pregnancy can be misdiagnosed as twinning condition. Therefore, differential diagnosis of endometrial cyst from twinning is important and can be done based on certain distinguishing features of endometrial cyst such as: irregular shape, thickened wall and absence of growth on next day as observed in pregnancy (Fig. 1 c). Not all conceived twins persist; after fixation, unilateral twins will naturally reduce to a singleton 85% of the time via deprivation of adequate embryonal maternal nutrient exchange [8, 9, 10]. Still, natural twin reduction does not generally occur before day 15 and does not occur when twins fixate bilaterally; therefore, twin pregnancies that are detected during the mobility phase or are bilaterally fixated are best managed by the manual crushing of one embryonic vesicle. Without transrectal ultrasound and veterinary intervention, twin pregnancy would be the biggest single cause of abortion in mares. Twin pregnancies are optimally first detected between days 14 and 16 of gestation. Twin embryos are managed by natural embryo death, spontaneous or induced abortion, manual crushing and ultrasound guided allantocentesis. Routinely, for management of twinning manual crushing is done using rectal pinch methodology at day 16 to 17 of pregnancy before fixation as, if left until after this stage, there is a significant risk to the remaining concept us, especially in unilateral pregnancies where it is very difficult, if not impossible, to separate the vesicles without damaging both pregnancies [8, 9, 3].

Vesicle for reduction can be pinched between thumb and forefingers (Rectal pinch technique) or it can be crushed by applying pressure between transducer and the pelvis. There should be a feeling of slight vibration as the vesicle ruptures and detection of little amount of free fluid in the uterus at the spot of crushing as observed by ultrasonography. For rectal pinch technique, size of vesicle should be more than 15 mm since if vesicle size is less than 15 mm it is frequently slippery and difficult to crush such embryonic vesicles^[14]. Therefore, manual crushing should be done on vesicles more than 15 mm in size as success rate and easy of doing are more in such vesicles. If embryonic vesicle size is less than 15 mm then in such cases manual crushing should be postponed one or two days as it will result in more efficiency as well as differential diagnosis from endometrial cyst condition based on growth in former in comparison to the latter condition. Re-examination should be done at 4 to five weeks of pregnancy and if there are heart beats in both embryo then it means that manual crushing was unsuccessful. Therefore, in this article successful management of twinning in mares using manual crushing at day 16-17 of pregnancy have been discussed.

Materials and Methods

The present study was carried out in 6-11 years aged mares ($n = 7$) in field conditions. Mares were checked for general health followed by clinical gynecological examination. Before handling mares were sedated using a combination of Inj. detomidine-hydrochloride (Detomidine HCL 5 mg/ML; Nexgen pharmaceuticals Pvt. Ltd.) @ 0.01 mg/kg and Inj.

Butor ject (Butorphanol tartarate; Phoenix Pvt. Ltd. Butorphanol) @ 0.1 mg/kg via intramuscular route. To prevent irritation to rectal mucous membrane owing to tail hairs, tail bandage was applied. By means of aseptic procedures, epidural anesthesia was achieved using infiltration of lignocaine Inj. Xylocaine (Lignocaine HCL 2%; German remedies Pvt Ltd.) @ 1 mL/100 Kg body weight) by 18G needle in the epidural space of first intercoccygeal joint. At the time of per rectal examination, liquid paraffin containing 2% lignocaine (Lignocaine HCL 2%; German remedies Pvt. Ltd.) (1:5 ratio) was used as lubricating agent. Thereafter, thorough rectal examination of the reproductive system was done in routine manner. Subsequently, using portable ultrasonography machine (Hitachi Aloka Prosound 2 POCUS) conceptuses number, size and localization were evaluated via transrectal ultrasound (frequency 7.5 MHz). The tonicity of uterus was relaxed by intravenous application of Inj. PromAce® (Acepromazine maleate 10 mg; Boehringer Ingelheim Vetmedica pvt. Ltd.) five minutes before manual crushing which is induced by high concentration of progesterone (≥ 4 ng/mL) from the primary CL^[13]. Thereafter, manual crushing of embryo was performed between day 16 to 17 of gestation. To prevent lysis of corpus luteum Inj. Megludine (Flunixin meglumine; Virbac Pvt. Ltd.) @ 2.2 mg/kg was administered twice post treatment. Later on, ultrasonographic examination for a viable singleton pregnancy was performed by ultrasonographic examination after two weeks of manual crushing.

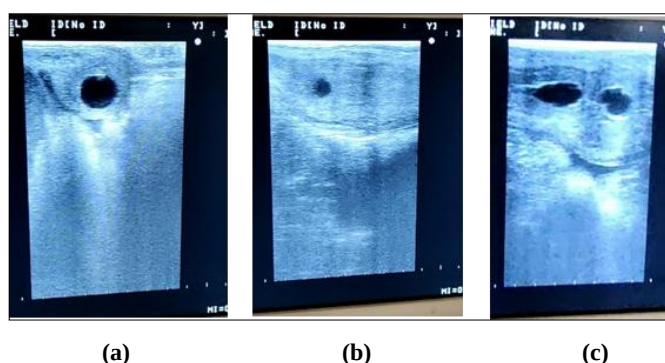


Fig 1 a & b: Ultrasound images of bilateral (asynchronous) twins (Fig. 1 a & b) in separate parts of the uterus. Fig. 1 c Endometrial cyst characterized by irregular shape and thick hyperechoic walls.

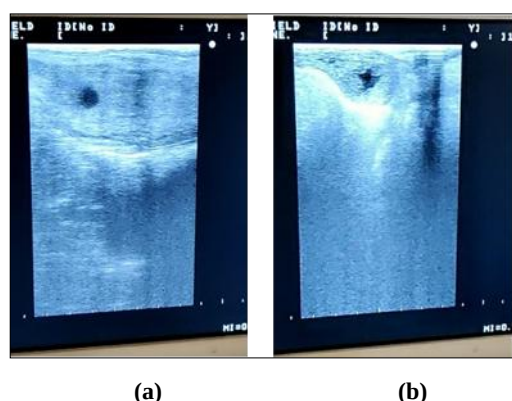


Fig 2 a & b: Ultrasound images of asynchronous embryo before (a) and after manual crushing (b)

Results

In present study, all the twins were bi-cornual and no uni-cornual twinning case was encountered. Manual crushing was performed in seven mares aged 6-11 years between day 16

and 17 of gestation. Excluding one case, manual crushing resulted in a viable singleton pregnancy as observed by ultrasonography two weeks post treatment (day 30). However, in one mare manual crushing resulted into loss of other embryo as observed by ultrasonography on day 30. Therefore, in present study the success rate of manual crushing was (85.71%; 6 out of 7).

Discussion

The most effective medical approach to reduce equine twin pregnancy has been manual crushing of 1 cm embryonic vesicle during the mobility phase (day 16 after ovulation) with a greater than 90% success rate^[17, 16]. In the present study, success rate of around 85.71% was observed using manual crushing (at day 16 to 17) which is in agreement with earlier studies. The success rate is influenced by the size of the uterine horn, and the spatial relationship between the twin embryonic vesicles (unilateral vs bilateral twins). In bilateral twin success rate 50-60% and in unilateral twins it is very difficult to crush embryo without disturbing other leading to

loss of both pregnancies [18]. In general, the smaller or the most accessible embryonic vesicle is crushed. However, during the early period of embryonic fixation (16 to 30 days post ovulation), the success rate of twin reduction is significantly reduced. During the period of embryonic fixation Days 16-17 of gestation, approximately 70% of twin vesicles will fix in the same horn unilateral. The remaining embryo develops normally following natural reduction [7, 9]. However, unilateral twins that do not undergo natural reduction to a singleton are challenging to manage. Manual reduction of a unilaterally fixed twin is difficult without damaging the remaining conceptus. The success (disappearance of 1 vesicle) of manual crushing after unilateral fixation is significantly reduced (25%), although it is still high in bilateral fixation [15, 4]. Success is also dependent on operator experience but is not generally influenced by position of the twins in the uterus [19, 20]. However, in mares greater than nine years of age that have a twin reduced are potentially at greater risk of pregnancy failure [19]. Manual reduction techniques have been demonstrated to cause the release of PGF2 α for up to 90 min, with the amount being directly correlated to the pressure required to effect rupture [16]. Thus, treatment with flunixin meglumine and altrenogest following reduction may reduce pregnancy failure rates. Bilaterally fixed twin pregnancies typically do not result in natural reduction to a singleton conceptus during early pregnancy [7]. Instead, both fetuses often survive until later stages of gestation, at which time abortion usually occurs [12]. Manual crush of a bilateral twin results in reduction to a singleton pregnancy in 75% of cases if performed before 30 days of gestation [16]. Delayed attempts to reduce twin pregnancies *i.e.*, beyond 30 days of gestation more likely results in abortion of both conceptuses with manual reduction techniques [1, 16]. Moreover, management of equine twin pregnancies after 30 days gestation is further complicated by the formation of endometrial cups at approximately Day 36 of gestation.

Conclusion

Diagnosis and management of twin pregnancies in the mare are an ongoing challenge for the equine veterinarian. Early detection of twins using transrectal ultrasonography and manual crush of one embryonic vesicle are the two most important tools an equine veterinarian can implement for management of twins. The best time to deal with twins is just after fixation *i.e.* day 16 and 17 of gestation. In the case of asynchronous twins, repeated ultrasound assessments may be necessary to determine if twins are present. Manual reduction of one of twin vesicles prefixation does not result in a higher rate of embryonic death in the remaining vesicle than that encountered with singleton pregnancies. Therefore, manual crushing at day 16-17 is an efficacious treatment strategy for management of twinning in mares.

Conflict of Interest

Not available.

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