

Reduction of Twin Pregnancy by Transvaginal Ultrasound-guided Aspiration in a Mare

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(Received: December 29, 2016 / Accepted: April 16, 2017)

Abstract : A 3-year-old Thoroughbred mare was referred to J&C Equine Hospital with gestation day 30 twin pregnancy. On transrectal ultrasonographic examination, two similar sized (28 mm) embryonic vesicles, unilaterally fixed in the uterine horn, were detected. Transvaginal ultrasound-guided aspiration (TUGA) was performed for reduction of one embryonic vesicle. Yolk sac and allantoic cavity fluids from one embryonic vesicle were aspirated by a needle guided by using transvaginal ultrasound. The mare continued normal singleton pregnancy after twin reduction and delivered a foal successfully. This is the first case described the clinical use of TUGA in Korea. Clinical use of TUGA in twin reduction after embryonic fixation is recommended for equine clinicians.

Key words : twin, transvaginal ultrasound-guided aspiration, horse.

Introduction

Twin pregnancy is the most important cause of non-infectious abortion in mares, accounting for 10% - 30% of all such occurrences (3). In spite of improvements in early twin detection and management techniques using ultrasonography in mares (2), twin pregnancy continues to result in economic losses in the equine industry. To maintain a normal pregnancy in horses, diagnosing a twin pregnancy before embryonic fixation (i.e., approximately gestation day 16) and managing it via a manual crush method is common (11). Survival rate associated with the manual crush method for unfixed twin reduction is over 90% (10). However, twin reduction after embryonic fixation is difficult and results in a reproduction schedule delay after reduction failure (1,6,8).

Transvaginal ultrasound-guided aspiration (TUGA) is a post-fixation twin reduction method that aspirates embryonic fluids from one embryonic vesicle by using a transvaginal ultrasound-guided needle (1,6,7,8,9). The first report on the success of TUGA for twin pregnancy reduction in horses indicated a 46% (6/13) success rate reassessed 10 days after aspiration (1). Several other reports have presented a range of success rates related to gestation day, location of fixed embryonic vesicles (unilateral and bilateral), and technical differences (aspiration and puncture) (1,7).

This is the first report of unilaterally fixed twin reduction in a mare by performing TUGA in Korea. In this case report, we describe procedures, result, and a recommendation for clinical use of TUGA.

Case

Early twin detection was missed in a 3-year-old 450 kg Thoroughbred mare. The mare was referred to the J&C Equine Hospital, Incheon, Korea at twin pregnancy on gestation day 30. On transrectal ultrasonographic examination, two similar sized (28 mm) embryonic vesicles, unilaterally fixed in the uterine horn, were detected (Fig 1A, Fig 1B). TUGA was performed for reduction of one of embryonic vesicles. In the first step of the TUGA process, the mare received a non-steroidal anti-inflammatory drug (Fluximine®, Bayer, Auckland, New Zealand, 1.1 mg/kg, IV), sedated with detomidine (Equadin, Dongbang Inc., Suwonsi, Korea, 0.01 mg/kg, IV), and restrained in the stock. The tail was bandaged and the vulva and perineal areas were scrubbed. A 5 MHz transvaginal probe (MyLab™30Gold VET, Esaote S.p.A., Florence and Genoa, Italy) was encased in sterile plastic to hold a 47 cm long stainless steel channel (ordered equipment) (Fig 2A). A 20 mL syringe connected to a sterile 19 G needle was placed within the stainless steel channel and guided by it. The encased probe was introduced into the vagina while the other hand assisted with transrectal manipulation (Fig 2B). The probe was advanced to the uterus horn containing the embryonic vesicle that had been selected for TUGA (Fig 3). A virtual puncture line on the ultrasound screen was used to ensure precise placement between the needle and the yolk sac and allantoic cavity of the selected embryonic vesicle. After the tip of the needle was positioned to the middle of the vesicle, the tip of needle was advanced through the stainless steel channel guide and 5 mL of embryonic fluid was aspirated. Ten days after the TUGA procedure, the mare was reassessed and confirmed as singleton pregnancy (Fig 1C). The mare continued with a normal pregnancy and delivered a

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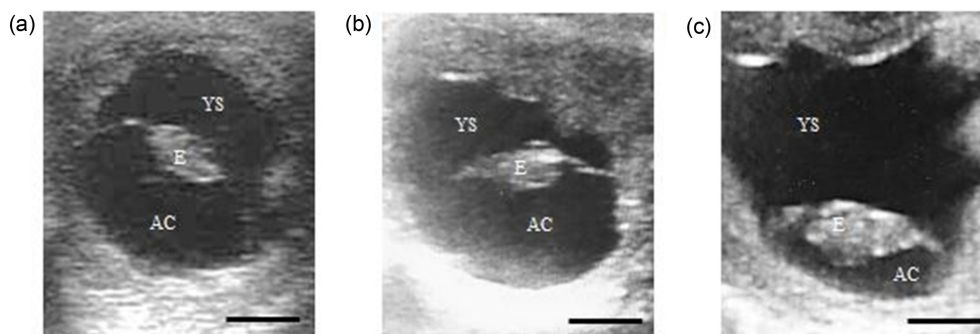


Fig 1. (A, B) Transrectal ultrasonographic images of embryonic vesicles at gestation day 30 of the unilateral twin pregnancy. (C) Ten days after the TUGA procedure, transrectal ultrasonographic image of normal singleton embryonic vesicle. Embryo (E) is situated in the middle of the embryonic vesicle and divides vesicles into two cavities with the yolk sac (YS) and the allantoic cavity (AC). Bar = 10 mm.

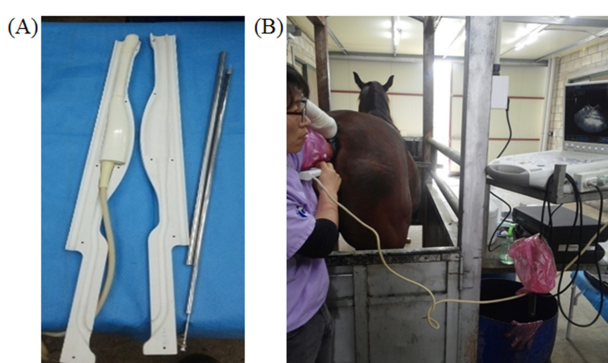


Fig 2. Instruments used in TUGA procedure. (A) From left: plastic case of ultrasonographic probe, from right: stainless steel channel guide for needle. (B) Photograph taken while performing twin reduction by TUGA in the case of mare.

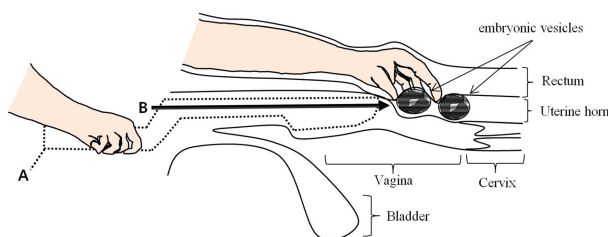


Fig 3. Procedure of TUGA. (A) Plastic case of ultrasonographic probe containing stainless steel channel guide for needle. (B) Arrow presents orientation of the needle and embryonic vesicle that had been selected for TUGA. The encased probe was introduced into the vagina while the other hand assisted with transrectal manipulation. The probe was advanced to the uterus horn containing the embryonic vesicle. After the tip of the needle was positioned to the middle of the vesicle, the tip of needle was advanced through the stainless steel channel guide and 5 mL of embryonic fluid was aspirated.

foal successfully 320 days after TUGA procedure.

Discussion

Approximately 85% of unilateral twins are naturally reduced before gestation day 40 in mares, and a size distinc-

tion between two embryonic vesicles is often noted before natural reduction (4). In the current case, a twin pregnancy was confirmed at gestation day 30 with no opportunity for natural reduction. Twin vesicles were unilaterally fixed in a uterine horn without distinct size discrepancy. Unilateral twins after the fixation period (i.e., approximately gestation day 16) are difficult to manage with manual reduction (1,6,8). Only 28% of mares that undergo manual reduction between gestation days 28 and 42 gestation brsucceed in giving birth to a single foal (5). Therefore, in this case, the best choice for reducing the post-fixation twin pregnancy was TUGA.

Gestation date is the most influential factor on success rate in TUGA because performing TUGA as soon as possible increases the success rate (1,6,9). In unilateral twins, TUGA performed prior to gestation day 35 has a higher success rate (40%, 2/5) than that for TUGA beyond gestation day 35 (25%, 1/4) when 10 days after the TUGA procedure (1). Jonker *et al.* (1995) also noted that TUGA produced significantly high success when performed before gestation day 35 and reported a high success rate (56%, 9/15) (6). Furthermore, TUGA performed before gestation day 25 achieves a high success rate (70%), whereas, after gestation day 40 the success rate of TUGA was 0% (0/3) (9). In the present case, twin reduction was successfully performed at gestation day 30 and the mare had a normal pregnancy and delivered a foal successfully.

Technical differences (aspiration vs. puncture) and fixation locations of twins (unilateral vs. bilateral) affect success rate of twin reduction by TUGA (1,7). In the present case, embryonic fluid was aspirated from one of the embryonic vesicles rather than only puncturing the vesicle. That approach was based on a previous study into in TUGA-based twin reduction, which reported that aspiration of allantoic fluid had a higher success rate (83%, 10/12) than that for allantoic puncture only (50%, 6/12) (7). With regard to fixation location, the twin reduction success rate for unilateral twins (33%) was considerably lower than that of bilateral twins (75%) (1). Unilaterally fixed twins have the additional limitation of being able to aspirate one embryonic vesicle without penetrating the other adjacent embryonic vesicle when positioning the needle. Furthermore, leakage from an incompletely aspirated embryonic vesicle can result in separating of placental membranes from the endometrium (7). In contrast,

when performing the TUGA on a bilaterally fixed twins, complete fluid aspiration is possible and also recommended (8).

Uterine irritation as a consequence of operator inexperience negatively influences TUGA success (8). Intraluminal fluid production can result from uterine irritation associated with advancing the needle, which can penetrate the uterus during the TUGA procedure. Progesterone therapy to enhance uterine tone prevents the production of intraluminal fluid (7,12). In the present case, no additional progesterone was prescribed because intraluminal fluid was not detected in the mare after twin reduction. Furthermore, side-effects such as fever and abdominal pains were not identified in the mare and the singleton pregnancy was successfully maintained after TUGA-based twin reduction.

Overall, this is the first case described the clinical use of TUGA in Korea. The result indicates that TUGA is a good option for equine clinicians dealing with post-fixation twins before gestation day 35.

Acknowledgments

This research was supported by the 2016 scientific promotion program funded by Jeju National University.

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