Induced lactation nurse mares used to raise Standardbred sale yearlings
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Abstract

The use of nurse mares is common in the horse breeding industry for reasons ranging from orphan foals to management of difficult mares. An alternative to parturient nurse mares is the induction of lactation in barren mares. Mares selected must have raised a foal previously and exhibit good maternal behavior. Over two years at a Standardbred breeding farm in central Kentucky, 35 mares from a herd of retired or adopted broodmares raised sale yearlings. All mares given a foal adopted it completely and raised it to weaning without incident. In the first year a combination of domperidone, progesterone and estrogen was used to induce lactation. In the second year domperidone alone was used after exposure to artificial photoperiod. Better lactation results were obtained in the first year. Sale results from the first crop of foals raised showed no drop in sale price as a result of being raised by induced lactation mares. This indicates that these mares raise a foal indistinguishable from a naturally raised foal.

Keywords: Induced lactation, nurse mares, foal adoption

Introduction

Nurse mares are commonly employed to raise orphan foals, foals from poor dams, foals from difficult to breed dams or foals whose dam must be shipped for breeding. These nurse mares are traditionally mares which have recently foaled, meaning their own foal is replaced with the adopted foal. The generation of these “nurse mare foals” has become an animal welfare concern which has stigmatized the use of purpose-bred nurse mares. Another negative to the use of these nurse mares in large breeding operations is the introduction of diseases into the herd and facilities when the nurse mares are employed. The fact that nurse mares are sent to farms to raise foals, return to a central location to foal and then disseminate the following year to new farms means they may easily spread communicable diseases from one farm to another.

An alternative to a parturient nurse mare is to induce lactation in a mare. Previous reports have shown success generating an adequate milk supply in non-parturient mares provided they have raised a foal previously. Reports of successful adoptions and raising of foals has been presented previously, but the adoption protocols have been time-consuming. For large-scale commercial use of these mares the adoption protocol must be quick, reliable and repeatable and the mares must be able to successfully raise foals indistinguishable from foals raised on parturient nurse mares on their natural dams.

Due to semen shipping restrictions imposed by some state breed incentive programs, some mares must be bred in certain states. Rather than ship or foal those mares off-farm, our farm has made frequent use of nurse mares to raise the foals from dams which must be shipped cross-country for breeding in other states. This allows us to foal on the farm and raise these foals while shipping the mares to the states required for breeding. The frequent use of nurse mares on this farm has resulted in increased disease levels within the foal population, increased cost associated with raising foals and increased labor needs for breeding the nurse mares. Non-parturient induced lactation nurse mares were investigated in an effort to control the traffic of horses on the farm, establish disease control, decrease costs and eliminate production of unwanted foals.

Mare selection

Mares to be used for induction of lactation were adopted from rescue organizations or recruited from our retired mare herd. The year one herd reached a maximum of 24 mares, of which induced lactation was attempted on 23. The herd consisted of 13 Standardbreds, eight Quarter Horses and three Thoroughbreds ranging in age from seven to 22 years old. One Quarter Horse mare was added in the second year. Twenty-three of the 25 mares had known reproductive histories and raised a foal previously. Foaling had occurred between one and five years previously in these mares, with the mares having raised between one and 12 foals. To be selected a mare had to be in good physical condition, easy to handle for injections or oral medications, willing to have her mammary gland manipulated and have no history of prior negative maternal indicators. Mares were held for at least one month on the farm before attempting to induce lactation.

Induction of lactation

Year 1: Based on previous studies and discussions with local practitioners, a sulpiride based protocol was attempted at first in year one of the study. This protocol did not result in significant milk production in our mares and was abandoned after the second mare. Both mares were switched to a domperidone based protocol as...
were the remainder of mares in this study. Twice daily oral domperidone at twice the normal dose (2.2 mg/kg PO) was administered. Mares were given IM progesterone and estrogen (150 mg and 10 mg, respectively) once daily. Mares were not milked until adoption. Mares were observed daily for milk production and filling of the teats. Mares remained on the domperidone and steroids until adoption was attempted, ranging from six to 16 days. All 22 mares received this treatment with the earliest beginning on February 6 and the latest beginning on May 4.

Year 2: All mares were placed under lights to maintain a photoperiod of 16 hours daily starting on December first. Domperidone (2.2 mg/kg PO twice daily) was used without the addition of exogenous steroids. Seventeen mares were used this year, with 16 being mares used the previous year and one mare added to the herd in the middle of the season. Mares were selected based on ease of handling and successful milk production the year before.

Adoption protocol
Mares were considered ready to adopt a foal when they had “filled” within one hour from being manually milked. The dam of the foal to be adopted was moved to a separate barn and the foal left alone for one hour prior to adoption. Foals were between 16 hours and 13 days old at adoption. The nurse mare was placed into stocks with an adjacent small foal stall approximately eight feet by eight feet. The mare stocks have solid walls with a padded hole large enough for the foal to nurse (Figure 1). The rear of the stocks is the height of a normal palpation stock and allows for cleaning and manipulation of the mare. The mare was held with a lead rope or chain over her nose depending on disposition. The mare was given dinoprost (5 mg, IM), oxytocin (5 IU, IV), and romifidine (20 µg/kg IV). Immediately after the injections the mare’s tail was tied with brown gauze and the mare was cleaned as for breeding. By this time the mare was usually sedated and starting to sweat and cramp from the dinoprost. The foal was brought into the stall and loosely held with the foal’s hindquarters near the mare’s head. The foal was not allowed to assume a nursing position at this time. Vaginal and cervical massage was begun and continued for two to four minutes. The cervix was dilated after initial massage and the interior of the cervix was gently massaged. During this time most mares would nicker or lick the foal and begin to show interest in it. After the cervical stimulation the foal was allowed to assume a nursing position and attempt to nurse. The mare was corrected by voice cues or a quick response on the lead if she acted aggressively to the foal at this time. Mares which would not allow the foal to nurse were restrained only if they were a risk to the foal. After nursing, the foal was removed from the stall. If the mare responded by vocalizing and becoming anxious in the stocks they were both taken to a stall and the mare held on the lead rope while her behavior towards the foal was monitored. The mare was released when the foal could approach and nurse without the mare responding aggressively.

Results
Lactation
In the first year, 22 mares were given treatment with domperidone, progesterone and estrogen. Twenty of these mares produced a milk supply deemed adequate to adopt a foal. One of the mares which did not produce adequate milk was a mare with an unknown reproductive history and showed no mammary development during two weeks of hormone stimulation. The other mare did have increased mammary size but produced only a small amount of watery fluid when milked after two weeks of hormone stimulation. One mare was not needed at the time she had achieved a significant amount of milk. This mare was turned out to pasture for two months and then started on the treatment again. At the time she was started on treatment the second time she did not have noticeable mammary development. She responded to treatment after six days and produced adequate milk for a foal. Mares with known histories of multiple prior foals subjectively responded with more milk than those with one prior foal. No differences were noted in mares having foaled the previous year compared to the mares with more time elapsed since the previous foaling. Attempts to induce lactation in April and May were subjectively felt to result in better milk supplies.

In the second year, 17 mares were started on domperidone only after being subjected to artificial photoperiod for a minimum of two months. Sixteen of the second year mares were mares which had been considered successful the year before. Fourteen of these mares responded with an adequate milk supply to adopt a foal. One mare had been added to the herd and did respond to treatment with an adequate milk supply. Two of the mares did not maintain an adequate milk supply for the foals. Domperidone treatment was restarted ten days after adoption in both of these mares. One mare slowly increased her milk supply to acceptable levels over two weeks. The second mare did not recover and throughout this lactation provided only a small amount of milk, approximately half of what was expected. It should be noted that this mare successfully raised a foal the year prior and was deemed to have an excellent milk supply in that year. A single mare which was started on treatment but did not
receive a foal had established an ample milk supply by day 9. No foal was available for this mare and she subsequently stopped producing milk by day 16 of treatment. This occurred in May, so no attempt was made to re-initiate lactation in this mare. This mare is not included in the above numbers.

Adoption

In the first year 16 of the 20 mares used for adoptions adopted their foals fully within one hour. Three of the mares required an additional attempt at nursing one hour after the initial attempt before showing no aggression towards the foal in the stall. A single mare showed favorable signs towards the foal but kicked and squealed when the foal would attempt to nurse. Removal of the foal from the stocks area resulted in a normal maternal response from the mare, with anxious behavior and anxious calling for the foal. Even after these displays she would not allow the foal to nurse. After 12 hours the mare allowed the foal to nurse when twitched. After 24 hours the pair was released in a stall and normal maternal behavior followed. All 20 mares raised their foals until weaning with no differences in maternal behavior compared to normal mares.

In the second year all fifteen mares attempted adopted their foals within one hour after the initial nursing attempt. One mare refused to enter the stocks so the adoption was performed in the stall, with the vaginal stimulation occurring while the mare was entered half into the stall. This mare quickly became interested in the foal and allowed the foal to nurse. For safety reasons this method (outside of the stocks) was not attempted again.

Foals

In the first year the foals grew vigorously after a full milk supply became established in two to four weeks. During the initial weeks following adoption these foals appeared to not gain weight at the same rate as their naturally raised counterparts. By weaning time these foals were indistinguishable from naturally raised foals in the same fields. As yearlings their sizes were as expected based on pedigree and they did not experience a higher than normal incidence of conformation problems or developmental orthopedic problems.

In the second year the foals seemed to take longer until a more normal growth rate occurred, usually four to six weeks before they began to thrive. The two foals whose adoptive dams did not maintain adequate milk supply required supplementation with milk replacer six times daily, supplied by bucket. While these foals should have been getting adequate nutrition from the milk replacer alone they had an unthrifty appearance and were significantly smaller than their peers at weaning. As yearlings they are no longer smaller than their peers and are indistinguishable from other naturally raised yearlings.

Sale results

Sixteen of the first year foals were sold at a major Standardbred auction in November 2009. The results are summarized in Table 1. The average sale price for the farm’s consigned horses (n=35) was $25,652. The average sale price for the 16 nurse mare raised foals was $28,188. The average sale price for farm yearlings represented only by the same sires as the nurse mare raised yearlings was $27,620. The farm’s highest price yearling at this sale ($67,000) was a nurse mare raised yearling. The prices obtained were within expectations given the sale climate and the pedigrees of the horses offered. The four remaining first year foals were kept for racing or breeding. Race data are not available at this time.

Discussion

The nurse mare needs of this farm were met entirely for two years by induced lactation nurse mares. These mares raised foals which were in every aspect identical to naturally raised foals. The comparable sale prices of the yearlings at auction demonstrate that there is no lasting detriment to the foals when using induced mares.

The goal in the second year was to allow for only oral medications to be used. It was felt that the steroid hormones would be unnecessary in cycling mares. To that end, photoperiod was used alone. Mares were not checked for ovarian activity prior to starting treatment, so it is unknown if this explains the lack of success in getting two of 17 mares to lactate or the failure of two of 15 mares to maintain adequate milk production. The remaining mares performed as expected. Future use of induced lactation mares at this farm will include steroid hormones based on the superior results in the first year, but investigation into the effect cyclicity has on milk production is warranted. An additional concern raised by the poorer response in the second year is the possibility that repeated attempts at inducing lactation in a mare will have diminishing success. This requires further investigation.

In discussion with practitioners cost is often questioned. The additional costs associated with induced lactation mares are the maintenance of the mare for the extra months from weaning until the next foal is adopted and the treatment itself. These costs, on this farm, were less than the cost of leasing a parturient nurse mare from a nurse mare provider. In addition, extra labor and expense are required for parturient nurse mares since most providers
require that the mare be returned in foal. While there is initially increased labor with the induced lactation mares, not having to breed these mares quickly recovers the labor investment. The use of induced lactation nurse mares appears to be a cost saving measure.

The fact that this farm had an established need for nurse mares at known times made this protocol particularly desirable. When a donor mare would begin to show signs of impending foaling a nurse mare would be started on treatment. This usually meant the nurse mare would be eight to ten days into treatment before the foals were ready for adoption. Some mares obtained a level of milk which would have been adequate to supply the foal before the foal was ready for adoption, but in all cases the mare was given a foal within three or four days of being deemed ready. The single mare who did not receive a foal quit producing milk after seven days beyond her peak milk production. It is likely this mare could have been maintained by frequent milking as others have described. Her response, however, does reduce the likelihood that one could start a mare lactating early in the season and hold her ready until she was needed.

While significant numbers are not available to determine if sale results are identical, the lack of noticeable drop in sale price at auction indicates that the animals raised by induced lactation nurse mares are of identical quality to those raised on their own dams. This is important in the adoption of this method of nurse mare production within the horse breeding industry. Although a decline in weight is noted for two to four weeks following adoption, these foals rapidly become equal to foals of the same age. However, information given the author by other practitioners suggests that the initial weight loss is enough to convince owners of valuable animals to not try this technique.

References

Table 1. Public sale results grouped by sire of foal (2009)

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<th>Sire</th>
<th>Foals at Sale</th>
<th>Farm Foals at Sale</th>
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Figure 1. A mare and foal after introduction in the stocks.