**Orphan Foals and Nurse Mares**

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## Abstract

Management of the orphaned foal can be both daunting and rewarding. The age at which a foal is orphaned determines the approach and intensity of the management required. This talk will focus on foals orphaned from birth to 3 months of age. Feeding, care, socialization and grafting orphaned foals to nurse mares will be discussed.

## Orphan Foals

Orphaned foals may be the result of parturition complications, severe illness or rejection by the dam. Primiparous mares are more likely to reject foals than multiparous mares. Arabian mares have been shown to reject foals at a higher rate than other breeds, with a familial pattern in this breed. Inherited, learned, and environmental factors have been proposed to cause foal rejection. However, no significant relationship has been found between foal rejection and presence of humans, nearby horses, or assistance with nursing in the first hour of life.[1] Neonatal foals hospitalized in intensive care settings are typically physically separated from the dam by a barrier to allow for multiple fluid lines, medications pumps and positioning of the ill foal. Indifference or aggressive rejection is not uncommon following intensive care hospitalization, despite best efforts to maintain the mare-foal bond.

Feeding

Feeding is a primary focus of care for the orphan foal. Nutritional support begins with colostrum if the foal is orphaned in the first 12 hours of life. Good quality colostrum (SG>1.060 on a colostrometer or 20-30% using a Brix refractometer) should be provided to foals in the first 12-24 hours of life. Two to three liters of colostrum divided into 200-250mL feedings will generally provide the immunoglobulin G (IgG) level of 800 mg/dL desired. The rate of immunoglobulin absorption from the small intestine declines rapidly after 12 hours of age, ceasing around 24 hours of age.[2] Nasogastric tube feeding may be necessary to ensure colostrum is successfully provided to the orphan foal. After 24 hours of age, intravenous plasma is required to provide immunoglobulins to neonatal foals.

Healthy foals nurse up to eight times per hour in the first few days of life, consuming a large volume of milk over several feedings. The average foal (45kg) consumes 10-12 liters of milk per day in the first week of life, at a rate of 20-35 mL/kg/day. This large volume of fluid results in dilute urine in the healthy foal (isosthenuric for the first 2 days of life, then hyposthenuric).[3] Mare's milk is naturally the best feed for the orphaned foal and may be safely obtained from a heavy-producing mare at 300-500mL/day and frozen for future use. Substitutions for mare's milk include goat's milk, modified cow's milk, and commercial replacers. Goat's milk contains more total solids, fat, and energy than mare's milk, so is often diluted with water or replacer to prevent constipation. Cow's milk also contains excess fat but insufficient energy for the foal, and therefore requires the addition of dextrose (not sucrose, i.e., table sugar) to meet the foal's needs. Addition of 20g dextrose per liter of 2% cows milk is recommended if no other options are readily available.[4] Goat's milk is better tolerated in foals than modified cow's milk in the

author's experience. Commercial milk replacers specifically made for foals often contain excess total solids when reconstituted according to manufacturer's instructions. This excess can result in an osmotic diarrhea. Clinicians commonly reconstitute commercial foal replacers at a slightly lower ratio than recommended (1:9 or 1:10 powder to water ratio, or ¾ of the recommended powder) to avoid this problem. The author's preference is to combine a commercial mare's milk replacer and goat's milk at a 1:1 ratio to begin with. Adjustments to this ratio are made for the individual foal based on appetite and gastrointestinal tolerance.

Feeding methods for orphan foals in the absence of a nurse mare include bucket, bottle, or automatic feeder. The latter has not been utilized by the author. Bottle feeding allows for aspiration of milk by the foal (often unbeknownst to the bottle holder), requires more time, and allows for excess bonding between the foal and humans. Bucket feeding, while often more difficult to train to, is the author's preferred method of feeding. Temperature of the offered milk appears to be important and an individual preference among orphan foals. For training to a bucket, a shallow bowl is used to allow the foal's eyes to remain above the rim. Once the concept of drinking in this manner is accepted, transitioning to a shallow, flat-back bucket hung on the wall between the foal's elbow and shoulder height is generally simple. Nasogastric tube feeding is occasionally required in the orphan foal who refuses to drink or cannot swallow effectively (ex: neonatal maladjustment syndrome). A stallion catheter may be used for single feedings (i.e., colostrum or intermittent feeding while training to a bucket), but for repeated feedings, a smaller diameter indwelling tube is recommended.

## Nurse Mares

A lactating nurse mare is considered to best option for both feeding and socializing the orphan foal. Social media allows for rapid identification of potential nurse mares in a specific geographic region. The ideal nurse mare will have recently (in last 1-3 days) lost a foal or originate from a commercial nurse mare operation. Grafting the mare and orphan foal is a process requiring horsemanship, and often significant patience. Pharmacological "encouragement" of acceptance has been effective in encouraging maternal behavior in rejection scenarios as well as with foal acceptance by a nurse mare. Protocols utilizing prostaglandin F2-alpha +/- oxytocin +/- vaginal/cervical stimulation in the mare/nurse may aid in acceptance of the foal. [5,6] Various methods are used to encourage acceptance of the foal by the mare, and these will be discussed in the presentation. Generally, it is the mare who needs encouragement to bond with the orphan foal. Exceptions include the savaged orphan foal, or the foal recovered from intensive care who has not experienced the mare-foal bond and is bonded with humans.

The reason for and timing of the dam's absence is not typically a focus of orphan care education, as it does not change feeding requirements significantly. However, consideration of this fact is relevant to the overall support of the orphan foal, in the author's experience. Orphaned foals who lost their dam during parturition or shortly thereafter often accept the feeding and management methods caregivers provide more readily than those foals orphaned after several days to weeks with their dam. Aggressive rejection of a foal (savagery) often results in a different behavioral pattern in the orphaned foal than does avoidance rejection. Management strategies to mitigate the behavioral problems associated with these variables must be considered when caring for the orphan foal.

Pharmacological induction of lactation is safe and effective in the non-parturient mare. For best results, a calm mare who has delivered and nursed at least one foal is selected. Ovarectomized and anestrus mares may be used but are not ideal candidates. Multiparous, "good mothers" are considered the best candidates for lactation induction and orphan foal acceptance. Hormonal treatment requires a single injection of estradiol-benzoate (0.1mg/kg IM), daily altrenogest administration (22 mg/day PO, beginning on Day 1) and a dopamine antagonist (domperidone 1.1mg/kg PO BID, or sulpiride 1mg/kg IM BID or 2mg/kg PO BID). When the mammary gland becomes visibly enlarged (around day 4-5), begin milking the mare every 4 hours. A commercial milking device (Udderly EZ) or modified 60cc syringe case may be used to improve the milking process. Within 2-5 days of milking, the mare's milk production should be sufficient (3 liters milk/day or more) to introduce the orphan foal. Grafting the mare with induced lactation and the orphan foal involves the same process as grafting a lactating mare and orphan foal. Once adoption of the foal has occurred, altrenogest is discontinued while dopamine antagonist therapy is continued for a total of 14 days. [7]

## Care and Management

Orphan foals without a nurse mare often spend more time recumbent than foals living with mares. For this reason, umbilical care, stall cleaning and skin care are important. Enrichment is as important in the early days of orphan care as socialization is in later stages. Using a grate on the stall front allows the foal to observe activities in the barn. In some cases, the orphan foal remains withdrawn, reluctant to eat, walk, or play. In these scenarios, introduction of a goat,

miniature horse, or other adult companion may be useful. Physical separation with visibility is ideal initially and during feeding times. In the author's experience, physical contact with another animal is beneficial to the orphan foal. Small paddock turnout adjacent to friendly horses allows for observation of normal horse behavior and safe interaction between the orphan foal and others. Prolonged stall confinement may result in weakened soft tissue structures and increased risk of injury upon eventual turnout.

Indications for antimicrobial use in the orphan foal do not vary from those in normal foals. Ulcer prevention is a common thought among those caring for orphan foals, as stress is clearly high in the early stages. However, in a study of hospitalized foals, administration of omeprazole or histamine Type 2 blocker did not reduce the incidence of ulcers but increased the risk of diarrhea.[8] Likewise, a study of 691 foals presented for postmortem showed that antacid administration was not correlated with the presence of gastric or duodenal ulceration. Additionally, prevalence of gastric ulcers was higher in weanling aged foals than in neonates. In all foals, the presence of ulcers was associated with gastrointestinal disease.[9]

Diarrhea and constipation are common in milk replacer-fed foals. If temperature, attitude, and appetite remain normal, careful adjustment of the milk's concentration often solves the problem. Clinical signs of disease (fever, lethargy, inappetence) should be addressed with antimicrobials in the neonatal foal following diagnostic tests to identify the cause of disease. So-called "foal heat diarrhea" is common among orphan foals as with foals at dam's sides, supporting the theory

of microflora and pH changes at 7-10 days of age are the cause of the diarrhea. This is typically self-limiting, short-lived and does not warrant treatment if the foal remains clinically normal.

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